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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. Robert Olesen, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 JULY 3, 1936 NO. 27

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

May 17–June 13, 1936

Influenza.—The number of cases of influenza dropped from 11,783 for the 4 weeks ended May 16 to 3,324 for the 4 weeks ended June 13. The incidence was about 65 percent above that for the corresponding period in each of the 3 preceding years. In each geographic area, except the Mountain and Pacific and South Central, the disease had dropped to about the normal seasonal level. The minor epidemic of the past winter started in the West and spread into the South Central regions. While the incidence has dropped considerably from the high peak attained in March, the number of cases reported from each region still remains the highest in recent years. The general death rate, which usually reflects the presence of influenza, fluctuated considerably, but the average rate (14.4) in a group of large cities for the 4-week period was approximately the same as for the corresponding period in 1935.

Poliomyelitis.—There were 89 cases of poliomyelitis reported for the 4 weeks ended June 13. The epidemic of 1935 began in North Carolina about this time, and during this period in that year 240 cases were reported for the country as a whole; in 1934 the epidemic that started in California was in progress and 911 cases were reported for this period. For the more normal years of 1933, 1932, and 1931 the numbers of cases for the corresponding period were 61, 108, and 124, respectively.

Meningococcus meningitis.—The number of cases of meningococcus meningitis dropped from 912 for the preceding 4-week period to 532 for the current period. For the first time since this disease began to increase in the winter of 1934 the incidence for a 4-week period fell below that for the corresponding period in the preceding year. In 1935 the number of cases reported for this period was 568, the highest incidence since 1929, when 919 cases were reported. In the current period the South Central regions reported about 75 percent increase

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The number of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48; scarlet fever, 48; influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

over last year's figure and the South Atlantic region about 20 percent increase. In the New England and Middle Atlantic regions the current incidence was about on a level with that of last year, while from other regions decreases ranging from 40 to 50 percent were reported. States in which the incidence is still considerably above the seasonal expectancy are Kentucky (57 cases), New York (46), Pennsylvania (39), Virginia (36), West Virginia (26), Massachusetts (24), and North Carolina (21).

Scarlet fever.—The incidence of scarlet fever followed the usual seasonal decline during the 4 weeks ended June 13. The total number of cases (18,493) was only about 80 percent of the number reported for the corresponding period in 1935, but it was considerably above the incidence in the 6 preceding years. In the West North Central and Mountain and Pacific regions the incidence remained the highest in recent years, but in all other sections it was at about the usual seasonal level.

Smallpox.—The number of cases of smallpox reported for the 4 weeks ended June 13 was 812. The disease still remained unusually prevalent in the North Central and Mountain and Pacific regions. The largest numbers of cases were reported from Iowa (109), Missouri (94), South Dakota (76), Kansas (75), Illinois (71), Nebraska (67), Wyoming (53), Montana (39), Oregon (36). No cases were reported from the New England and Middle Atlantic regions, 32 were reported from the South Central, and only 4 from the South Atlantic. For the country as a whole the current incidence was highest since 1932 when, owing to an outbreak in the South Central regions, 900 cases were reported for this period. The current incidence compares with 4,042 and 3,001 for the corresponding period in the years 1930 and 1931, respectively.

Typhoid fever.—For the country as a whole the typhoid situation was very satisfactory; 737 cases were reported for the 4 weeks ended June 13, the lowest incidence for the corresponding period in the 8 years for which these data are available. In each geographic section, except the West North Central, and Mountain and Pacific, the incidence fell below that of last year. In the West North Central region, Iowa with 16 cases and Kansas with 55 (51 of which occurred in Leavenworth) placed the incidence in that section on a level with that of last year. New Mexico with 24 cases and California with 46 cases seemed mostly responsible for a 60 percent increase over last year in the Mountain and Pacific regions.

Diphtheria.—The number of cases of diphtheria reported for the current 4-week period totaled 1,487. The incidence was about 15 percent below that of each of the 2 preceding years and 20 percent below that of 1933. Each geographic region has shared in the favorable diphtheria situation that has existed for some time. A gradual

decline has been in progress, and for the country as a whole the current incidence compares favorably with approximately 5,200 cases for this period in 1929.

Measles.—For the 4 weeks ended June 13 the reported cases of measles totaled 44,745. The number was less than 50 percent of that for the corresponding period in each of the years 1935 and 1934 and about 15 percent below the average for the 5 preceding years for which these data are available. The incidence still remained rather high in the Mountain and Pacific regions. The New England and Middle Atlantic sections reported about the normal seasonal incidence, while in the North Central regions it was somewhat below the expectancy.

Mortality, all causes.—The average mortality rate from all causes as reported by the Bureau of the Census for the 4 weeks ended June 13 was 11.4 per 1,000 inhabitants (annual basis). The rates for the separate weeks were 11.7, 10.9, 11.6, and 11.3, respectively. The average rate for this period in the years 1930 to 1935, inclusive, was 11.3. In only one week (ended May 30) has the rate for 1936 been below the rate for the corresponding week of 1935. A minor influenza epidemic accounts for at least part of the excess.

MORTALITY FROM CERTAIN CAUSES DURING THE FIRST QUARTER OF 1936[1]

This report presents mortality data for 25 States, the District of Columbia, and Hawaii for the first quarter of 1936, with comparative data for recent years. In addition to the death rate from all causes, rates are shown for 17 specific causes, 4 groups of causes, and for infant and maternal mortality.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of some lack of uniformity in the method of classifying deaths according to cause, some delayed death certificates, and various other reasons, these preliminary rates cannot be expected to agree in all instances with final rates published by the Bureau of the Census. The final figures are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve as a current index of mortality until final figures are available.

The populations used for 1934 and 1935 are the official estimates as published by the United States Bureau of the Census on May 11, 1936. These estimates are corrected to agree with the population of the United States as computed from births, deaths, immigration,

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

and emigration since the 1930 census. Since no estimates have been prepared for States for 1936, the figures used are an extrapolation from the official 1935 estimates, with the same annual increment as that used by the Bureau of the Census for the year 1935 as compared with 1934. Populations for 1933 were estimated by making the increment for 1934 over 1933 the same as that used by the Census Bureau for 1935 as compared with 1934.

At the top of the table, rates are given for a group of 20 [2] States with an estimated population of 70,000,000 that have data available for the first 3 months of each of the 4 years 1933–36. For individual States, data are shown for the first 3 months or for as many of those months as are now available, with rates for corresponding periods of 2 preceding years. Comparisons discussed in the following refer only to the 20 States with complete data.

The death rate from all causes for the first quarter of 1936 was 12.5 per 1,000 (annual basis), as compared with 11.9, 11.9, and 11.7 in the first quarters of 1935, 1934, and 1933, respectively. In 18 of the 20 States the rate was higher in the first quarter of 1936 than in the same quarter of 1935.

Infant mortality does not show this rise in 1936, being 58 per 1,000 live births, as compared with 64, 64, and 66 in the 3 preceding years. The decrease in infant mortality was just as general as the increase in the total mortality; 18 of the 20 States had lower infant mortality rates in the first quarter of 1936 than in the same quarter of 1935.

The death rates from measles and whooping cough were both much lower for the first quarter of 1936 than for the first quarter of 1935. In both 1934 and 1935 these two diseases were exceptionally prevalent. The scarlet-fever rate was slightly more in 1936 than in any of the 3 preceding years. Considering individual States, an increase from 1935 occurred in 10 States and a decrease in the other 10 States included in the data. Diphtheria showed a small decrease from 1935 in 14 of the 20 States, in 3 other States the rates for the 2 years were the same, and only 3 States showed an increase. Meningitis was definitely higher in 1936 than in immediately preceding years, 13 of the 20 States having higher rates in 1936 than in 1935.

When the general death rate shows a widespread increase, the most usual cause is an influenza epidemic. This year the death rate from all causes increased in 18 of the 20 States, but deaths credited to influenza decreased in 16 States. Pneumonia, however, does not confirm the absence of respiratory disease as the cause of the increased death rate, for the pneumonia rate increased from 126 to 142 per 100,000—an increase which was shown by 13 of the 20 States. In a former report [3] attention was called to an epidemic-like rise in the

[2] See footnote to table for States included.

[3] Public Health Reports, June 5, 1936

general death rate in February and March of 1936 which was accompanied by a sufficient number of influenza case reports to identify it as due to influenza and pneumonia; however, there was little mention of the epidemic presence of influenza in the current press or medical journals.

Tuberculosis showed a continuation of its regular decline, but only 12 of the 20 States participated in the decrease from the 1935 level.

Diseases of the heart, nephritis, cerebral hemorrhage, cancer, and diabetes all showed a continuation of their usual upward trend, 13 to 19 States showing increases in these diseases in 1936 over 1935. The increases were particularly large for diseases of the heart (from 280 per 100,000 in 1935 to 311 in 1936, with 19 of the 20 States showing increased rates), cerebral hemorrhage (89 per 100,000 in 1935 to 97 in 1936, with 17 of the 20 States showing increased rates), and diabetes (27 per 100,000 in 1935 to 30 in 1936, with 16 of the 20 States showing increased rates).

Mortality from certain causes in the first 3 months of 1936, with comparative data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (16)	Lethargic encephalitis (17)	Meningococcus meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Diseases of the nervous system (78–89)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the circulatory system (90–103)	Diseases of the heart (90–95)	Diseases of the respiratory system (104–114)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–132)
20 States:[1]																									
1936	12.5	68	27	5.8	0.8	0.9	3.4	2.0	2.1	35.1	0.2	0.6	3.5	53.9	114.0	30.2	119.1	97.2	337.8	311.0	157.1	141.7	61.3	4.9	91.0
1935	11.9	64	31	6.1	.9	4.0	3.2	4.0	2.4	43.1	.2	.6	2.3	55.0	109.7	27.0	111.0	89.4	306.2	279.7	140.4	126.4	62.6	4.2	87.5
1934	11.9	64	30	6.0	.9	5.8	3.3	4.0	2.5	27.4	.3	.6	1.0	55.6	107.8	27.2	109.6	84.9	316.7	281.3	138.1	122.3	63.3	5.9	92.7
1933	11.7	66	32	6.3	1.2	1.9	3.2	2.7	2.5	61.7	.3	.7	1.6	59.1	105.3	26.5	109.4	84.7	289.0	253.1	125.1	111.1	60.7	5.5	88.8
Alabama:																									
1936	12.8	76	51	6.8	.8	.8	.4	2.7	4.1	113.4	.4	(2)	1.4	71.2	54.5	11.6	103.6	74.4	173.8	157.9	203.3	192.2	50.1	7.9	87.0
Connecticut:																									
1936	11.8	47	(3)	4.8	(4)	.5	1.1	2.1	.7	20.9	.2	.7	.9	41.3	135.6	35.5	(3)	(4)	(3)	269.1	(4)	132.4	(3)	3.5	100.1
1935	11.4	48	(3)	5.7	.1	2.8	2.1	1.4	.9	20.3	.2	.5	1.2	44.6	120.2	35.0	(3)	(3)	(3)	250.8	(3)	115.0	(4)	1.2	93.8
1934	11.4	63	(3)	6.0	.5	.2	1.2	1.2	.7	14.1	(1)	.7	.5	47.5	114.6	33.6	(3)	(3)	(3)	247.1	(3)	118.4	(4)	4.8	89.8
District of Columbia:																									
1936	16.9	68	32	6.4	3.2	(2)	1.3	2.0	7.7	21.1	.6	.6	14.1	121.0	134.5	33.3	164.0	124.2	447.7	390.0	237.6	216.5	81.3	5.8	103.8
1935	16.2	67	34	3.5	.7	(2)	2.7	(2)	6.1	31.4	(2)	(2)	17.1	108.6	123.6	35.5	144.7	121.5	425.4	372.1	241.0	224.6	88.1	8.2	99.7
1934	16.7	75	40	2.9	(2)	16.6	2.1	14.5	.7	12.3	.7	1.4	.7	131.1	123.8	37.6	145.6	110.1	486.7	428.0	197.7	175.3	83.3	6.5	120.2
Florida:																									
1936	11.9	67	30	8.2	1.2	.2	.2	1.2	3.9	101.7	.7	.7	3.9	55.8	88.2	24.0	146.2	118.1	328.0	305.0	159.7	139.6	84.5	5.1	124.4
1935	14.1	68	41	9.7	1.3	5.3	(2)	3.8	4.5	95.7	.8	(2)	.3	58.0	89.5	26.1	139.5	110.8	298.0	270.4	121.4	108.5	82.7	8.0	120.1
1934	13.6	70	38	7.8	2.6	4.3	.5	3.8	3.3	43.0	.5	.8	.8	59.6	80.8	19.4	142.4	108.2	280.0	262.6	125.8	110.2	88.0	11.5	131.4
Georgia:																									
1936	11.0	76	(3)	7.9	2.1	.1	.6	1.9	3.1	122.1	.2	.2	2.9	47.0	42.8	12.1	97.3	71.9	166.3	156.3	180.7	170.7	44.1	3.2	93.1
1935	10.6	79	(4)	8.9	1.7	1.2	.7	5.8	3.9	99.8	.8	(2)	1.1	50.4	44.6	12.1	98.3	69.3	159.9	149.6	146.0	136.3	58.9	4.1	96.6
1934	10.6	96	(3)	7.2	3.0	35.8	.7	9.5	5.7	54.6	.6	.2	.4	48.9	43.7	12.3	99.3	64.4	157.7	144.6	152.6	142.5	48.0	5.6	93.1
Hawaii:																									
1936	8.0	75	45	5.0	3.7	(2)	(2)	1.8	1.8	21.2	(2)	.9	4.6	70.9	63.5	10.1	54.3	40.5	154.6	142.7	86.5	75.5	67.2	19.3	65.3
1935	8.4	73	41	5.5	1.0	(2)	(2)	2.9	(2)	7.6	(2)	(2)	2.9	77.1	61.9	14.3	60.9	44.7	121.9	115.2	90.4	78.1	68.5	19.0	80.0
1934	9.9	91	56	7.5	3.9	1.0	(2)	11.7	(2)	18.6	(2)	(2)	2.9	88.9	55.7	22.5	62.5	41.0	115.3	104.6	204.2	188.6	97.7	30.1	54.7
Idaho:																									
1936	11.5	48	21	2.9	.8	1.6	17.4	1.6	.8	27.4	(2)	(2)	12.4	23.2	82.1	10.6	109.5	76.3	262.0	209.0	184.1	161.7	58.0	.8	26.5
1935	10.3	77	38	8.6	1.7	2.5	2.5	12.7	(2)	37.2	(2)	4.2	5.9	26.2	70.3	16.1	86.4	60.1	193.0	149.9	165.9	144.8	63.5	1.7	28.8
1934	10.3	53	18	4.8	.8	2.6	4.3	1.7	2.6	24.0	.8	1.7	3.4	33.4	58.3	12.9	125.2	90.0	208.4	180.9	144.9	130.3	59.2	2.6	42.0

Illinois:																									
1936	12.6	53	23	4.3	.2	.2	5.1	2.2	2.8	22.9	.1	.2	3.2	51.8	127.6	33.9	113.2	89.3	375.2	351.7	134.2	118.1	66.2	3.4	115.2
1935	11.9	57	25	5.5	.8	8.3	7.4	3.1	3.0	40.7	.2	.3	3.9	53.7	124.1	26.8	99.8	74.9	312.1	288.8	132.4	121.9	69.0	3.0	104.9
1934	11.8	57	23	5.8	.5	3.2	5.1	2.3	1.4	17.7	.2	.4	1.9	53.4	121.5	31.5	105.9	77.4	324.7	301.9	117.1	105.2	68.8	4.0	115.4
Indiana:																									
1936	12.8	56	(3)	5.3	.5	.3	5.1	1.4	5.7	43.4	.1	1.2	1.6	51.3	102.9	20.2	(3)	140.6	(3)	283.4	(3)	157.3	(3)	3.6	82.6
1935	12.4	65	34	6.0	.7	6.6	6.3	5.9	3.5	58.2	(2)	.6	3.5	52.0	111.5	15.2	(3)	143.0	(3)	290.7	(3)	137.3	(3)	2.7	69.1
1934	12.1	55	27	5.3	.8	7.0	5.5	4.5	4.2	37.7	.3	.6	.8	52.9	107.5	19.2	(3)	119.7	(3)	277.1	(3)	121.5	(3)	3.3	87.8
Iowa:																									
1936	10.9	52	19	5.8	1.3	.3	6.2	2.1	1.9	28.6	(2)	(2)	3.5	22.9	124.1	29.4	147.2	120.2	299.1	267.2	123.6	113.2	57.9	2.7	74.5
1935	10.9	62	32	4.8	1.1	15.8	2.7	1.4	2.6	45.4	(2)	.5	1.4	28.5	120.0	26.6	132.2	107.1	266.0	240.1	127.4	115.2	57.3	2.9	60.3
1934	10.8	59	25	6.9	.3	1.0	2.4	2.9	1.6	38.9	(2)	.8	1.1	22.5	115.8	25.4	154.1	122.0	254.2	222.2	137.9	120.3	53.7	2.9	54.6
Louisiana:																									
1936	13.1	88	53	11.1	3.6	3.4	.4	5.3	5.5	80.1	.6	.4	1.9	71.6	71.8	22.0	102.7	78.6	269.8	237.0	106.8	179.0	69.1	12.1	114.0
1935	11.6	72	40	7.4	5.4	9.2	1.1	3.1	5.5	52.8	.8	.4	1.3	75.0	72.1	18.0	97.9	72.1	221.3	195.7	137.2	122.8	70.4	9.0	110.4
1934	10.8	77	49	9.5	6.5	4.0	1.0	8.0	5.7	38.3	.2	.4	.4	70.9	74.3	15.3	92.1	59.0	230.8	210.7	116.1	101.3	66.5	18.6	103.1
Maryland:																									
1936	15.0	65	35	5.2	1.2	2.9	.7	3.6	2.2	23.5	(2)	1.4	13.2	84.8	133.5	33.4	159.2	132.5	383.9	355.4	201.7	184.6	54.3	3.8	166.2
1935	14.6	68	34	6.4	.7	2.7	2.4	4.1	2.2	42.0	(2)	.7	4.1	86.0	127.0	31.8	150.2	127.8	357.4	330.5	194.2	178.1	62.7	6.3	140.9
1934	14.0	69	35	5.6	1.2	3.6	3.2	10.5	1.2	16.6	.2	1.2	.2	83.9	129.7	25.6	149.2	118.8	344.6	313.0	177.3	161.9	51.4	6.3	156.6
Michigan:																									
1936	12.3	56	26	6.0	.4	.4	3.8	2.5	.7	20.4	.3	.9	1.6	45.3	116.4	29.6	128.2	102.2	342.0	310.7	149.0	133.4	72.9	6.3	73.3
1935	12.1	61	25	5.8	.6	3.1	3.6	3.0	.7	34.1	(2)	.2	.6	46.6	113.9	29.8	125.6	96.8	315.1	285.4	141.8	126.3	71.5	4.4	71.3
1934	12.1	64	27	6.2	.5	1.0	6.2	2.8	1.1	26.4	.3	.1	.5	47.6	108.7	27.4	135.5	103.0	325.0	295.7	138.8	121.0	72.5	6.0	73.1
Minnesota:																									
1936	11.0	49	18	5.1	.8	1.5	8.8	1.1	.3	16.9	.2	.4	2.4	35.1	128.0	27.8	115.6	94.2	268.3	256.4	125.2	111.2	58.9	4.7	50.0
1935	10.6	56	26	5.8	(2)	3.6	4.6	3.4	.5	36.9	.2	1.1	2.5	34.3	132.0	22.8	108.1	85.2	242.7	219.1	122.0	111.5	64.4	4.6	54.8
1934	11.1	52	20	6.0	.3	2.2	1.9	4.5	1.1	26.6	.3	2.0	1.4	39.5	128.6	23.9	110.0	87.9	261.4	236.8	132.2	117.5	69.6	1.8	63.5
Montana:																									
1936	12.8	53	(3)	6.8	1.5	.8	15.1	4.5	3.0	32.6	(2)	(2)	3.0	44.7	100.0	18.2	123.5	93.2	238.6	221.9	212.8	192.4	75.0	4.5	65.9
1935	12.7	78	(3)	7.0	1.5	16.0	3.0	4.6	4.6	85.5	.8	.8	1.5	48.1	105.4	16.8	107.7	80.2	226.8	211.6	216.1	196.3	94.7	7.6	85.5
1934	10.5	54	(3)	6.2	.8	1.5	5.3	1.5	1.5	38.2	(2)	.8	2.3	42.8	88.6	23.7	99.3	74.8	179.5	166.5	120.1	111.5	82.5	7.6	76.4
Nebraska: [4]																									
1936	11.4	47	20	8.8	1.3	2.2	13.4	.4	1.8	32.2	.9	.9	3.1	19.7	107.8	34.0	133.3	108.2	281.7	263.0	124.8	106.9	113.6	3.6	88.5
1935	10.7	56	31	6.2	.5	5.0	4.5	.9	3.2	56.7	(2)	1.4	4.1	21.8	102.5	21.3	141.5	110.6	224.1	201.4	154.2	138.3	67.6	4.5	51.7
1934	10.2	46	17	4.9	.5	(2)	2.7	6.8	1.4	27.2	.9	.9	(2)	26.3	122.0	17.7	122.5	103.0	216.8	197.7	118.4	102.0	66.2	.9	62.6
New Jersey:																									
1936	11.4	49	(3)	4.8	.5	.2	1.3	1.7	.6	15.3	.5	.6	2.4	53.8	123.5	37.0	108.5	90.4	362.5	339.9	127.8	114.4	54.1	3.2	83.0
1935	11.0	55	(3)	4.4	.5	1.1	.7	3.2	.9	20.3	.3	.6	.6	49.1	109.7	31.8	106.3	85.3	342.3	322.0	110.9	100.5	55.0	3.7	89.8
1934	11.5	53	(3)	4.1	.4	1.6	2.9	1.6	1.2	10.7	.1	.4	.1	52.9	114.2	30.6	113.2	92.9	361.2	336.9	121.3	109.0	57.3	5.3	96.8

[1] States included are Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Louisiana, Maryland, Michigan, Minnesota, Montana, New Jersey, New York, Pennsylvania, South Dakota, Tennessee, Virginia, West Virginia, and Wisconsin (estimated population as of July 1, 1936, 70,188,000). Includes all of the States with available data for the 4 years covered by this summary. For a few causes, 1 to 3 States were omitted because of missing data.

[2] No deaths.

[3] Data not available.

[4] January and February.

Mortality from certain causes in the first 3 months of 1936, with comparative data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	All except malformations and early infancy	Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (16)	Lethargic encephalitis (17)	Meningococcus meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Diseases of the nervous system (78–89)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the circulatory system (90–103)	Diseases of the heart (90–95)	Diseases of the respiratory system (104–114)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–132)
New York:																									
1936	13.5	52	22	5.6	.7	1.6	2.5	1.0	.3	12.6	(2)	.8	3.5	62.1	147.0	40.4	115.4	89.8	431.3	401.8	160.5	153.7	70.3	5.7	92.1
1935	13.8	56	25	5.4	.4	1.3	2.2	3.0	1.1	16.4	.1	.6	1.7	60.8	130.9	36.8	105.7	83.8	406.3	369.0	133.5	102.0	69.2	5.3	92.2
1934	13.2	58	20	5.8	.3	.7	2.6	1.6	1.3	12.8	.2	.4	.9	64.1	138.6	35.8	81.3	55.9	437.6	375.5	146.8	133.2	74.5	6.7	96.1
North Carolina:																									
1936	11.8	72	(3)	6.8	.8	.2	.7	1.2	4.8	75.0	.3	.3	1.5	58.3	53.9	13.7	(3)	(3)	(3)	(3)	(3)	186.0	(3)	6.2	(3)
1935	11.8	78	(3)	7.0	.5	4.3	.9	12.8	4.7	78.2	1.1	.4	1.4	63.1	48.4	12.0	(3)	(3)	(3)	(3)	(3)	155.2	(3)	4.4	(3)
1934	11.4	90	(3)	7.8	.6	16.9	1.3	9.4	7.0	44.6	.4	.1	.5	63.8	48.9	12.6	(3)	(3)	(3)	(3)	(3)	169.4	(3)	5.3	(3)
Pennsylvania:																									
1936	12.6	54	24	5.2	.5	.6	2.3	1.4	1.8	27.0	.1	.5	1.8	46.7	113.1	34.3	127.6	101.7	363.7	344.1	141.0	124.9	57.6	6.3	94.8
1935	13.1	68	34	6.0	.5	3.4	2.9	2.6	2.3	43.8	.2	1.0	1.2	49.6	105.2	31.8	117.8	91.2	334.5	308.8	143.8	127.4	55.4	4.2	95.2
1934	12.8	68	35	6.0	.6	4.6	3.6	3.4	3.1	28.4	.2	.7	.7	52.5	101.9	32.0	123.0	96.5	333.6	298.2	139.2	123.1	59.1	7.6	105.5
Rhode Island:[4]																									
1936	13.8	49	19	2.4	(2)	1.8	3.6	.9	.9	24.2	(2)	1.8	5.4	44.8	132.6	39.4	130.8	117.3	445.2	412.9	191.7	189.9	60.6	4.5	125.4
1935	13.7	51	20	1.8	(2)	(2)	(2)	.9	.9	24.5	.9	(2)	(2)	53.6	151.7	48.1	144.4	118.1	440.6	409.7	152.6	138.1	65.4	3.6	109.9
South Carolina:[4]																									
1936	9.7	105	(3)	9.4	1.8	.6	.6	2.1	3.0	74.1	.3	(2)	3.3	44.5	37.4	11.0	97.3	88.0	162.8	149.5	168.7	156.3	16.6	1.5	67.9
1935	10.7	98	(3)	10.9	2.8	.9	(2)	10.1	2.8	124.2	.3	.3	1.2	46.7	29.2	10.1	96.2	83.6	180.5	171.0	128.8	122.4	12.8	3.7	80.3
1934	9.5	115	(3)	8.3	.9	7.2	.3	9.1	5.0	67.0	.6	1.3	(2)	43.1	36.5	12.0	(3)	(3)	183.0	(3)	(3)	128.6	9.1	(3)	90.0
South Dakota:																									
1936	9.6	49	23	4.7	1.8	.6	4.2	1.2	1.2	24.4	(2)	.6	(2)	40.5	94.1	21.5	107.8	88.2	199.0	181.7	114.4	103.0	49.4	5.4	77.5
1935	10.6	67	38	7.6	.6	9.6	2.4	3.6	1.8	69.7	1.8	(2)	.6	36.6	98.5	19.8	116.6	87.7	156.8	138.2	181.4	159.8	54.1	5.4	61.3
1934	10.3	67	36	5.1	1.2	25.1	4.2	10.2	1.8	48.4	(2)	.6	(2)	37.7	86.7	25.7	107.7	86.1	183.0	160.3	131.0	120.2	60.4	6.6	63.4
Tennessee:																									
1936	11.8	75	49	7.9	1.1	.7	1.9	3.1	4.5	103.8	.5	.4	6.4	88.1	60.2	12.4	100.5	77.1	181.5	167.2	211.3	198.5	52.6	3.5	65.3
1935	10.5	80	51	8.8	1.8	2.0	.6	8.0	4.9	83.9	.4	.6	5.7	86.3	58.2	12.0	99.4	77.1	148.9	136.4	155.0	145.1	51.1	3.1	57.8
1934	10.2	81	50	7.6	2.3	32.0	2.1	6.1	4.7	60.6	.7	1.1	1.4	82.1	54.8	10.8	97.8	77.5	152.2	141.8	144.7	113.7	52.5	6.0	59.8
Virginia:																									
1936	13.4	70	(3)	6.7	1.3	1.1	.9	4.4	4.7	83.1	.5	.5	10.0	71.0	70.0	20.2	134.9	108.7	262.8	262.1	186.6	172.2	44.1	3.9	106.6
1935	12.9	82	(3)	6.6	.8	13.2	1.2	11.7	4.9	95.5	.2	.3	4.0	80.7	68.1	19.4	128.6	100.4	264.1	244.1	150.4	138.1	44.8	2.9	94.4
1934	12.9	81	(3)	6.9	1.6	5.9	2.3	6.4	6.4	54.1	.6	1.1	1.6	52.6	67.3	21.7	122.5	95.5	253.0	234.6	145.0	131.1	44.6	4.2	96.0

West Virginia:																									
1936	11.3	77	40	7.3	1.0	2.0	2.4	3.8	6.6	52.7	1.9	.2	6.4	52.9	64.1	18.7	112.2	88.7	208.2	187.4	164.5	156.2	54.0	4.8	79.7
1935	10.8	79	42	7.6	3.6	10.7	5.8	13.2	8.9	65.0	.2	.4	4.5	60.3	67.4	10.9	98.0	77.0	159.0	140.5	144.0	136.4	55.2	3.3	70.3
1934	10.0	78	34	6.1	1.6	1.4	6.1	11.0	7.2	47.1	.9	.4	2.7	49.1	65.1	11.5	104.9	85.1	151.1	127.4	135.6	122.0	47.7	6.3	70.9
Wisconsin:																									
1936	11.7	55	24	4.4	.4	.7	7.6	2.1	.1	25.4	(1)	.3	1.9	39.8	132.6	29.2	(3)	106.8	(3)	310.6	(3)	103.2	(3)	4.4	77.0
1935	10.9	63	28	4.5	.1	2.5	6.0	.4	.6	25.8	.3	1.0	2.0	38.4	122.2	26.6	(3)	89.7	(4)	271.7	(4)	93.2	(4)	4.0	75.7
1934	11.0	60	25	4.3	.1	2.9	2.4	4.2	1.2	21.5	.1	.3	.4	41.3	127.0	25.5	(3)	93.2	(3)	261.4	(3)	110.6	(3)	4.0	75.3

[1] No deaths.
[3] Data not available.
[4] January and February.

Regulations of the Surgeon General Governing Allotments and Payments to States From Funds Appropriated Under the Provisions of Section 601, Social Security Act, for the Fiscal Year 1937

I. COMPLIANCE WITH LAW AND REGULATIONS

In order that funds allotted to the States may be of maximum use in assisting States, counties, health districts, and other political subdivisions of the States in establishing and maintaining adequate public health service, payments made to a State under authority of Title VI of the Social Security Act will be certified by the Surgeon General only after such State has complied with the provisions of the act and the regulations authorized thereunder.

II. ALLOTMENTS

Funds appropriated by the Congress for the fiscal year 1937 and balances remaining unpaid to the States at the end of the fiscal year 1936 will be allotted to the States on the basis of (1) population, (2) special health problems, (3) financial needs, as provided in Title VI of the Social Security Act of August 14, 1935, in accordance with the following percentage distribution:

1. POPULATION

Allotments amounting to 57½ percent of the available appropriations will be made to the several States in the ratio which the population of each State bears to the population of the United States as shown by the last decennial Federal census.

2 SPECIAL HEALTH PROBLEMS

Allotments amounting to 22½ percent of available appropriations will be made to the several States on the basis of special health problems, including the training of personnel, as determined by the Surgeon General.

3. FINANCIAL NEEDS

Allotments amounting to 20 percent of available appropriations will be made to the States on the basis of the financial needs of such States.

III. BALANCES FOR THE FISCAL YEAR ENDING JUNE 30, 1937

Unpaid balances of allotments at the end of such fiscal year shall not be paid but shall remain in the appropriation for reallotment to the States in the succeeding fiscal year in accordance with the provisions of subsection (b), section 602, of the Social Security Act.

Unexpended balances remaining from *quarterly payments* made to the States in accordance with the provisions of subsection (c) of section 602 of the Social Security Act may be retained by the States and utilized for carrying out the purposes specified in section 601 in any succeeding quarter or fiscal year subject to the following conditions:

(1) Balances required under these regulations to be matched with State or local funds must be so matched before they are expended.

(2) Budgets for the expenditure of such balances must be submitted and approved prior to such expenditure.

IV. SUBMISSION OF PLANS

To be eligible to receive payments from allotments, each State shall have presented (*a*) a comprehensive statement of the present State health organization, programs and budget; (*b*) a proposed plan for extending and improving the ad-

ministrative functions of the State department of health, and (*c*) a proposed plan for extending and improving local (county, district, city) health services to to be carried out with the assistance of funds available under the provisions of Title VI of the Social Security Act.

V. SUBMISSION AND APPROVAL OF BUDGETS

Before payments shall be made to any State, the State health officer shall—

(*a*) Submit to the Surgeon General and secure approval of a proposed budget, for each project, on forms supplied by the Public Health Service. The budget shall show the sources, purposes, and amounts of all funds, the amounts requested from the Public Health Service for the fiscal year, together with such other information relating to such proposed project as the Surgeon General may require.

(*b*) Certify that State and local expenditures have not been replaced or curtailed through the use of Federal funds.

VI. SUPPLEMENTAL AND REVISED BUDGETS

Supplemental budgets for the purpose of utilizing unpaid balances of allotments, or unexpended balances from payments made on the basis of previously approved budgets, may be submitted for any subsequent quarter after the beginning of the fiscal year, for (*a*) new projects or (*b*) adding new items to existing budgets.

Revisions of existing budgets shall be submitted whenever the rate of expenditure for any budget item is to be increased; but not when, through lapses or otherwise, the expenditures are to be decreased. Such savings from approved budgets may be transferred to other budgets after such revised budget is submitted for approval.

Supplemental and revised budgets submitted in any quarter after the beginning of the fiscal year shall not be made effective prior to the beginning of the next succeeding quarter: *Provided*, That exceptions to this rule may be made, with the approval of the Surgeon General, when necessary to meet emergencies.

VII. EXISTING APPROPRIATIONS NOT TO BE REPLACED

Payments to aid existing State or local projects will be supplemental to funds now being expended, and in no case shall such payments replace existing State or local appropriations for the purpose of relieving State or local authorities from expenditures now being made.

VIII. MATCHING WITH EXISTING PUBLIC FUNDS

Except as provided in regulation XI, one half of the amount allotted to States on the basis of population and for special health problems shall be available for payment when matched by at least an equal amount of existing appropriations of public funds for public health work.

IX. MATCHING WITH NEW PUBLIC FUNDS

Except as provided in regulation XI, one-half of the amount allotted to States on the basis of population and for special health problems shall be available for payment when matched by at least an equal amount of new appropriations of public funds for public health work made since January 1, 1935, or made prior to that date for the specific purpose of matching funds available under the provisions of the Social Security Act: *Provided*, That the Surgeon General in his discretion may permit not to exceed 50 percent of the money available for matching with new public funds to be matched with existing State appropriations for

local health service where the State is already making a substantial appropriation for this purpose.

X. PAYMENTS ON THE BASIS OF SPECIAL HEALTH PROBLEMS

In the allotment of funds for special health problems, this term shall be interpreted to mean necessity arising out of high morbidity or mortality on a State-wide basis from particular causes, such as malaria, hookworm, bubonic plague, trachoma, typhus fever, special industrial hazards, and similar geographically limited diseases or other conditions that result in inequality of exposure to public health hazards among the States.

XI. TRAINING OF PERSONNEL

In order to meet the needs for properly qualified professional and technical personnel with which to conduct effectively the State and local health services, the sum of $1,001,186 shall be set aside for the fiscal year 1937 and allotted to the States for this purpose. Of this sum $888,186 shall be allotted among the States in the same ratio which the sum of other allotments to any State bears to the whole. The sum of $113,000 shall be allotted to States on the basis of the special need of such States for the training of personnel in approved training centers.

XII. PURPOSES FOR WHICH TRAINING FUNDS MAY BE USED

Funds allotted to a State for the training of personnel may be used to pay living stipends, tuition, and traveling expenses of personnel employed or to be employed in the State and local health services, such training period not to exceed 1 year for any individual.

The Surgeon General will recommend to the States the maximum allowances for stipends, traveling, and other permissible items of expense for the training of personnel.

XIII. PAYMENTS ON THE BASIS OF FINANCIAL NEED

The funds to be allotted to the several States for the fiscal year 1937 on the basis of financial needs ($1,776,373) shall be distributed among the States as follows:

(*a*) A sum of $510,000 shall be allotted equally among the States.

(*b*) The remainder ($1,266,373) shall be allotted among the several States on the basis of financial need as determined by the financial ability of the State expressed indirectly in terms of per-capita income.

Payment from the allotments made on these two bases of financial need will not be required to be matched with State or local funds.

XIV. METHOD OF PAYMENT TO STATES

Payments to the States shall be made in quarterly installments, subject to approval of the Secretary of the Treasury, to the Treasurer of the State or other State official authorized by law to receive such funds.

XV. CUSTODY AND DISBURSEMENT OF FUND

All such payments shall be held by the State official to whom made in a separate fund distinct from other State funds and shall be disbursed by him solely for the purpose or purposes specified in budgets approved by the State health officer and the Surgeon General and filed with such official.

XVI. FINANCIAL REPORTS

The State health officer shall submit to the Surgeon General on forms provided for that purpose quarterly financial reports as follows:

(*a*) A quarterly project financial report for each budget in force; and
(*b*) A consolidated quarterly report summarizing all budgets.

The consolidated quarterly financial report must be certified also by the Treasurer or other State official charged with the responsibility for disbursing funds.

The reports shall show the amount of Public Health Service funds actually expended, the actual expenditure of State and local funds, and such other information as the Surgeon General may from time to time require.

XVII. PROGRESS REPORTS OF ACTIVITIES

Quarterly reports of activities will be required by the Public Health Service from each State health department as follows:

(*a*) Activities of central administration and service projects pursuant to approved budgets shall be reported quarterly in duplicate and may be submitted in narrative form.
(*b*) A copy of the progress report from each local health project pursuant to approved budgets shall be furnished to the regional office on forms of the State health department.
(*c*) A consolidated summary report for all local projects pursuant to approved budgets shall be made to the Surgeon General on forms provided by the Public Health Service for that purpose.

The listing of certain items on the summary report form referred to above should not be interpreted as requiring that all such activities be carried out in every local health project. Also, other activities not listed on the report form should be reported in an appropriate manner.

Statistical reports may be submitted with narrative reports wherever considered desirable by the State health officer.

XVIII. REPORTS OF ACTIVITIES AND EXPENDITURES FROM "OTHER AGENCIES" NOT REQUIRED

No detailed accounting of expenditures and no detailed reports of activities will be required for personnel and other expenditures paid from funds supplied by other agencies unless such funds are used for purposes of meeting the matching requirements of the Public Health Service.

THOMAS PARRAN,
Surgeon General.

Allotments to States from funds appropriated under the provisions of Section 601, Social Security Act, for fiscal year 1937, together with unpaid balances of allotments from the appropriation for fiscal year 1936

[Allotments recommended by the Surgeon General and approved by the Secretary of the Treasury]

State or Territory	Total	Allocation on basis of population	Allocation on basis of special health problems		Allocation on basis of financial needs
			Special diseases and conditions	Training personnel	
Total	$8,881,859	[1] 5,107,068	[1] 997,232	$1,001,186	$1,776,373
Alabama	243,752	109,694	17,000	24,689	92,369
Alaska	35,291	2,458	17,000	3,575	12,258
Arizona	57,498	18,056	22,000	5,824	11,618
Arkansas	180,324	76,874	15,000	18,265	70,185
California	330,826	235,336	38,500	46,990	10,000
Colorado	92,239	42,936	22,400	9,343	17,560
Connecticut	98,040	66,610	11,500	9,930	10,000
Delaware	31,024	9,882	8,000	3,142	10,000
District of Columbia	51,943	20,182	16,500	5,261	10,000
Florida	129,630	60,862	21,082	13,130	34,556
Georgia	262,913	120,566	17,500	26,630	98,217
Hawaii	53,688	15,268	14,500	5,438	18,482
Idaho	62,859	18,448	22,400	6,367	15,644
Illinois	406,873	316,310	39,352	41,211	10,000
Indiana	217,781	134,244	11,500	22,059	49,978
Iowa	193,479	102,426	9,800	19,597	61,656
Kansas	140,877	77,972	9,800	14,269	38,836
Kentucky	229,928	108,352	18,500	23,289	79,757
Louisiana	177,039	87,116	11,500	17,932	60,491
Maine	67,941	33,056	9,800	6,882	18,203
Maryland	125,433	67,632	26,000	21,692	10,109
Massachusetts	247,464	176,158	29,500	31,806	10,000
Michigan	280,293	200,726	25,000	44,567	10,000
Minnesota	200,054	106,282	15,000	36,440	42,332
Mississippi	192,767	83,312	11,500	19,525	78,430
Missouri	238,616	150,446	23,892	24,169	40,109
Montana	63,676	22,286	21,300	6,450	13,640
Nebraska	113,981	57,120	9,800	11,545	35,516
Nevada	38,471	3,774	20,800	3,897	10,000
New Hampshire	48,580	19,268	9,800	4,921	14,571
New Jersey	217,861	167,524	18,270	22,067	10,000
New Mexico	69,157	17,548	25,500	7,005	19,104
New York	659,620	521,808	61,000	66,812	10,000
North Carolina	314,406	131,416	17,500	53,864	111,626
North Dakota	77,836	28,222	14,650	7,884	27,080
Ohio	351,313	275,522	28,000	35,584	12,207
Oklahoma	185,101	99,322	9,800	18,749	57,230
Oregon	80,041	39,536	19,676	8,107	12,722
Pennsylvania	500,988	399,244	41,000	50,744	10,000
Rhode Island	55,633	28,498	11,500	5,635	10,000
South Carolina	182,902	72,076	20,100	18,526	72,200
South Dakota	79,090	28,720	14,650	8,010	27,700
Tennessee	255,296	108,464	19,000	39,339	88,493
Texas	433,837	241,450	34,500	43,943	113,944
Utah	58,409	21,052	14,700	5,916	16,741
Vermont	46,613	14,906	13,000	4,721	13,986
Virginia	214,972	100,392	19,000	26,268	69,312
Washington	100,439	64,806	15,460	10,173	10,000
West Virginia	158,929	71,680	25,000	16,098	46,151
Wisconsin	183,203	121,830	9,800	18,556	33,017
Wyoming	42,943	9,350	18,900	4,350	10,343

[1] One-half of the amounts in this column is to be matched with existing funds and one-half with new funds.

DENTAL ACTIVITIES IN STATE DEPARTMENTS AND INSTITUTIONS

A survey of dental activities of State departments (health, education, welfare) and institutions of the United States was made by the Public Health Service at the request of the American Dental Association, with the approval of a committee of the State and Provincial health authorities, and the report of this survey has recently been published.[1]

This report is one of three parts of a dental study initiated by the American Dental Association. The other two problems have to do with the "Needs of the public from a dental standpoint" and "Means and methods of meeting the problem."

A survey of the incidence of dental defects in approximately 1,500,000 school children in 26 States was made by the members of the American Dental Association. The statistics of this survey were compiled and tabulated by the Public Health Service and have been published in Public Health Bulletin No. 226.[2]

The survey of dental activities in State departments and institutions is the first of its kind ever made in the United States. It covers a 5-year period (1928 to 1933), which includes both pre-depression and depression years.

In those departments having dental activities an attempt was made, with various degrees of success, to present detailed information on administration, methods, expenditures, and accomplishments. It is believed that this survey, together with the information obtained from the survey of dental defects among school children, will serve the purpose for which it was intended, viz, to assist the dental profession and departments of health and education and institutions to more efficient methods for coping with the most prevalent of diseases, dental caries.

DEATHS DURING WEEK ENDED JUNE 13, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 13, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8,094	7,621
Deaths per 1,000 population, annual basis	11.3	10.6
Deaths under 1 year of age	574	524
Deaths under 1 year of age per 1,000 estimated live births	52	48
Deaths per 1,000 population, annual basis, first 24 weeks of year	13.1	12.3
Data from industrial insurance companies:		
Policies in force	68,643,260	67,827,973
Number of death claims	12,498	13,413
Death claims per 1,000 policies in force, annual rate	9.5	10.3
Death claims per 1,000 policies, first 24 weeks of year, annual rate	10.7	10.5

[1] Public Health Bulletin No. 227.

[2] See Public Health Reports for June 26, 1936, for a brief review of the Bulletin

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 20, 1936, and June 22, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 20, 1936, and June 22, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935
New England States:								
Maine	2			1	534	188	0	0
New Hampshire					6	2	0	0
Vermont					301	39	0	0
Massachusetts	2	9			834	324	0	1
Rhode Island	2	1			13	362	3	0
Connecticut	3	6			107	361	0	1
Middle Atlantic States:								
New York	39	28	[1] 4	[1] 11	1,985	2,337	9	28
New Jersey	8	7	9	1	647	1,325	1	5
Pennsylvania	40	37			587	1,644	7	15
East North Central States:								
Ohio	17	20	11	4	217	653	4	9
Indiana	6	7	5	9	12	66	0	1
Illinois	42	46	23	13	36	976	10	4
Michigan	21	8		1	86	1,977	3	2
Wisconsin	2	3	18	26	186	1,561	2	1
West North Central States:								
Minnesota	4	4	1	4	103	140	1	2
Iowa	3	7			6	41	0	0
Missouri	13	14	32	51	9	95	1	4
North Dakota		2		1	2	31	0	1
South Dakota	3	1				9	0	0
Nebraska	2	8			19	50	0	1
Kansas	5	2	11	21	5	204	0	0
South Atlantic States:								
Delaware		1			17	15	0	1
Maryland [3]	12	4		2	265	119	4	8
District of Columbia	14	6		1	107	12	1	11
Virginia [3 4]	10	11			112	222	9	4
West Virginia	4	7	18	15	40	145	5	3
North Carolina [3 4]	8	10	1		28	13	9	3
South Carolina	1	7	52	52	19	21	1	0
Georgia [4]	3	8					0	6
Florida		5	10		7	2	2	1
East South Central States:								
Kentucky	2	7	8	3	29	131	8	5
Tennessee	3	3	20	15	11	33	4	0
Alabama [4]	9	8	5	17	1	35	2	1
Mississippi [3]	3	8					1	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 20, 1936, and June 22, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935
West South Central States:								
Arkansas	1	1	4	10	--------	15	0	0
Louisiana	16	16	8	11	8	9	1	1
Oklahoma [5]	5	5	14	26	1	13	3	1
Texas [4]	--------	22	81	30	158	22	2	2
Mountain States:								
Montana [3]	--------	1	2	3	3	112	1	0
Idaho [3]	--------	--------	--------	1	18	5	0	0
Wyoming [3]	--------	--------	--------	--------	--------	54	0	0
Colorado	1	10	--------	--------	21	132	0	0
New Mexico	3	--------	1	--------	16	13	0	0
Arizona	4	--------	18	2	52	6	0	0
Utah [2]	--------	--------	--------	--------	41	5	1	0
Pacific States:								
Washington	1	--------	--------	--------	178	260	0	1
Oregon	--------	5	8	14	34	109	2	0
California	22	36	517	24	1,107	928	4	8
Total	336	386	884	371	7,968	14,825	101	133
First 25 weeks of year	12,789	15,101	138,966	101,981	246,888	650,208	5,354	3,536

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935
New England States:								
Maine	0	0	15	13	0	0	1	2
New Hampshire	0	1	7	9	0	0	0	0
Vermont	0	0	14	5	0	0	4	0
Massachusetts	0	2	133	155	0	0	3	2
Rhode Island	1	0	24	14	0	0	0	0
Connecticut	0	1	21	46	0	0	0	1
Middle Atlantic States:								
New York	1	12	449	540	0	0	11	10
New Jersey	0	1	184	94	0	0	3	4
Pennsylvania	0	0	416	353	0	0	26	9
East North Central States:								
Ohio	0	2	92	213	0	0	6	11
Indiana	0	1	49	54	1	1	1	1
Illinois	4	0	301	661	12	1	9	12
Michigan	1	1	283	143	0	0	2	8
Wisconsin	0	1	296	311	4	6	4	0
West North Central States:								
Minnesota	0	0	120	92	17	4	0	11
Iowa	0	0	76	56	17	4	4	0
Missouri	0	0	80	18	0	2	14	9
North Dakota	0	0	29	31	4	0	2	1
South Dakota	0	0	14	5	17	15	0	0
Nebraska	0	0	31	33	9	34	0	4
Kansas	1	0	90	25	4	24	4	1
South Atlantic States:								
Delaware	0	0	--------	3	0	0	0	1
Maryland [2]	0	0	36	40	0	0	4	4
District of Columbia	0	0	5	7	0	0	0	0
Virginia [3] [4]	0	16	19	12	0	0	6	10
West Virginia	1	0	13	26	0	0	4	12
North Carolina [3] [4]	0	60	17	13	1	3	9	18
South Carolina	0	2	1	--------	5	0	12	32
Georgia [4]	0	0	8	5	0	13	21	53
Florida	0	0	3	1	0	0	3	6

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 20, 1936, and June 22, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22, 1935	Week ended June 20, 1936	Week ended June 22 1935
East South Central States:								
Kentucky	0	1	14	19	1	0	4	11
Tennessee	0	1	10	12	0	0	17	22
Alabama [4]	9	0	3	2	0	0	17	18
Mississippi [2]	0	0	6	4	1	0	8	16
West South Central States:								
Arkansas	0	1		6	0	3	2	16
Louisiana	1	3	5	11	1	0	16	21
Oklahoma [5]	0	0	10	14	3	1	10	14
Texas [4]	1	5	27	31	2	1	10	14
Mountain States:								
Montana [3]	0	1	32	15	21	3	1	3
Idaho [3]	0	0	6		0	0	1	0
Wyoming [3]	0	0	17	14	7	26	0	0
Colorado	0	0	18	61	0	1	0	0
New Mexico	0	1	19	5	0	2	4	4
Arizona	0	1	9	9	0	0	2	2
Utah [2]	1	0	20	39	9	0	0	1
Pacific States:								
Washington	0	0	39	34	0	18	3	1
Oregon	1	0	47	17	1	4	4	1
California	6	32	219	149	7	7	19	5
Total	28	146	3,327	3,420	144	171	271	371
First 25 weeks of year	476	865	172,219	168,735	5,575	4,700	3,307	4,084

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended June 20, 1936, 20 cases, as follows: Virginia, 5; North Carolina, 1; Montana, 3; Idaho, 3; Wyoming, 8.
[4] Typhus fever, week ended June 20, 1936, 32 cases, as follows: Virginia, 1; North Carolina, 1; Georgia, 20; Alabama, 6; Texas, 4.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March 1936										
Massachusetts	39	22			3,975	2	0	1,307	0	5
April 1936										
Massachusetts	26	23		1	5,569		3	1,217	0	1
May 1936										
Georgia	12	21	127	355	33	46	0	51	0	33
Idaho	2	1	9		242			89	24	4
Illinois	45	144	184	16	133	5	2	2,318	73	20
Kansas	3	26	32	3	46	1	0	944	91	6
Maryland	35	17	23	2	1,751	1	0	188	0	6
Massachusetts	27	26		1	6,104		16	924	0	9
Minnesota	13	21	6		2,139		1	1,308	25	4
Missouri	21	65	679	124	143	1	0	1,004	58	8
Montana	5	19	60	2	25			318	48	5
North Dakota	3	5	38		11		0	214	29	4
Rhode Island	6	3			272		1	98	0	0
Tennessee	32	32	635	228	185	56	3	83	3	20
Texas	28	135	1,088	2,172	1,855	101	5	295		44
Virginia	45	54	388	19	651	36	2	248	1	27
West Virginia	37	39	146		337		1	157	0	28

March 1936

	Cases
Massachusetts:	
Anthrax	2
Chicken pox	1,137
Epidemic encephalitis	2
Mumps	2,477
Paratyphoid fever	1
Rabies in animals	9
Septic sore throat	28
Typhus fever	1
Undulant fever	4
Whooping cough	399

April 1936

	Cases
Massachusetts:	
Anthrax	1
Chicken pox	895
Dysentery (amoebic)	1
Epidemic encephalitis	2
Mumps	2,174
Rabies in animals	15
Septic sore throat	29
Undulant fever	3
Whooping cough	363

May 1936

	Cases
Actinomycosis:	
Illinois	1
Tennessee	1
Chicken pox:	
Georgia	81
Idaho	27
Illinois	1,394
Kansas	234
Maryland	340
Massachusetts	877
Minesota	351
Missouri	216
Montana	180
North Dakota	30
Rhode Island	46
Tennessee	79
Texas	430
Virginia	244
West Virginia	85
Conjunctivitis:	
Georgia	1
Dengue:	
Georgia	12
Texas	2
Dysentery:	
Georgia (amoebic)	14
Georgia (bacillary)	17
Illinois (amoebic)	11
Illinois (amoebic carriers)	42
Illinois (bacillary)	4
Maryland (bacillary)	2
Massachusetts	3
Missouri	5
Tennessee (amoebic)	2
Tennessee (bacillary)	7
Texas (amoebic)	1
Texas (bacillary)	83
Virginia (diarrhea included)	36
Epidemic encephalitis:	
Georgia	2
Illinois	7
Kansas	2
Maryland	1
Missouri	3

May 1936—Continued

	Cases
Epidemic encephalitis—Continued.	
Rhode Island	2
Tennessee	1
Texas	5
Virginia	1
German measles:	
Illinois	58
Kansas	10
Maryland	445
Montana	7
Tennessee	16
Hookworm disease:	
Georgia	583
Tennessee	2
Impetigo contagiosa:	
Montana	6
Tennessee	4
Lead poisoning:	
Illinois	5
Mumps:	
Georgia	225
Idaho	88
Illinois	898
Kansas	209
Maryland	1,135
Massachusetts	1,889
Missouri	494
Montana	328
North Dakota	51
Rhode Island	138
Tennessee	209
Texas	1,619
Virginia	234
West Virginia	69
Ophthalmia neonatorum:	
Maryland	1
Missouri	3
Tennessee	3
Virginia	1
Patatyphoid fever:	
Georgia	3
Illinois	1
Kansas	51
Minnesota	1
Tennessee	2
Texas	6
Puerperal septicemia:	
Tennessee	3
Rabies in animals:	
Illinois	36
Maryland	2
Massachusetts	22
Missouri	10
Texas	19
Rabies in man:	
West Virginia	1
Rocky Mountain spotted fever:	
Idaho	10
Illinois	1
Maryland	3
Montana	30
Virginia	1
Scabies:	
Montana	1
Tennessee	9
Screw worm infection:	
Georgia	1
Septic sore throat:	
Georgia	21
Idaho	4

May 1936—Continued

	Cases
Septic sore throat—Con.	
Illinois	15
Kansas	11
Maryland	8
Massachusetts	17
Minnesota	4
Missouri	51
Montana	14
Rhode Island	6
Tennessee	17
Virginia	1
Tetanus:	
Illinois	3
Kansas	2
Maryland	2
Missouri	1
Tennessee	1
Virginia	2
Trachoma:	
Illinois	262
Missouri	33
Montana	1
North Dakota	2
Tennessee	34
Virginia	1
Tularaemia:	
Georgia	4
Maryland	1
Minnesota	1
Missouri	1
Texas	2
Virginia	1
Typhus fever:	
Georgia	29
Texas	30
Undulant fever:	
Georgia	4
Idaho	1
Illinois	10
Kansas	1
Maryland	3
Massachusetts	4
Minnesota	6
Missouri	3
Rhode Island	1
Tennessee	1
Texas	6
Virginia	4
Vincent's infection:	
Illinois	19
Kansas	25
Maryland	11
Montana	4
North Dakota	7
Tennessee	13
Whooping cough:	
Georgia	59
Idaho	8
Illinois	709
Kansas	118
Maryland	267
Massachusetts	331
Minnesota	148
Missouri	128
Montana	42
North Dakota	2
Rhode Island	6
Tennessee	110
Texas	315
Virginia	241
West Virginia	61

PLAGUE INFECTION IN MODOC COUNTY, CALIF.

The Director of Public Health of California has reported plague infection, proved by animal inoculation on June 3, 1936, in fleas taken from 178 squirrels shot on ranches in Modoc County, Calif., 4 to 6 miles south of Pine Creek.

CASES OF VENEREAL DISEASES REPORTED FOR APRIL 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	877	3.24	291	1.07
Arizona	55	1.20	117	2.56
Arkansas	237	1.28	154	.82
California	1,281	2.08	1,206	1.96
Colorado [1]				
Connecticut	165	1.00	86	.52
Delaware	89	3.68	44	1.82
District of Columbia	181	3.64	148	2.98
Florida	199	1.26	92	.58
Georgia	1,636	5.62	551	1.89
Idaho	0	0	0	0
Illinois	1,338	1.70	956	1.21
Indiana	119	.36	94	.28
Iowa [2]	111	.45	119	.48
Kansas	63	.33	53	.28
Kentucky	188	.71	189	.71
Louisiana	209	1.24	95	.44
Maine	33	.41	46	.57
Maryland	830	4.97	204	1.22
Massachusetts	514	1.19	486	1.12
Michigan	973	1.91	455	.89
Minnesota	321	1.23	229	.88
Mississippi	1,229	5.97	1,953	9.49
Missouri	614	1.67	359	.98
Montana [2]	37	.69	36	.67
Nebraska	25	.18	44	.32
Nevada [1]				
New Hampshire	15	.32	19	.40
New Jersey	471	1.11	164	.39
New Mexico	54	1.24	39	.89
New York	7,613	5.83	1,547	1.18
North Carolina	1,224	3.71	451	1.37
North Dakota	17	.25	28	.41
Ohio [2]	568	.83	167	.24
Oklahoma [2]	182	.74	123	.50
Oregon	80	.81	163	1.65
Pennsylvania [3]	259	.26	162	.16
Rhode Island	130	1.84	56	.79
South Carolina [2]	206	1.18	284	1.62
South Dakota	10	.14	14	.20
Tennessee	588	3.32	445	1.66
Texas	301	.50	114	.19
Utah [1]				
Vermont	21	.58	21	.58
Virginia	1,200	4.91	219	.90
Washington	134	.83	187	1.16
West Virginia	188	1.05	107	.60
Wisconsin [4]	34	.11	102	.34
Wyoming [1]				
Total	24,979	2.01	12,419	1.00

See footnotes at end of table.

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio	20	.74	7	.26
Atlanta, Ga	129	4.40	143	4.98
Baltimore, Md	498	6.03	121	1.47
Birmingham, Ala	110	3.90	59	2.09
Boston, Mass	218	2.76	219	2.77
Buffalo, N. Y.[5]				
Chicago, Ill	792	2.22	636	.178
Cincinnati, Ohio [5]				
Cleveland, Ohio	214	2.30	74	.80
Columbus, Ohio [5]				
Dallas, Tex.[5]				
Dayton, Ohio [5]				
Denver, Colo.[5]				
Detroit, Mich.[5]				
Houston, Tex.[6]	205	6.12	50	1.49
Indianapolis, Ind	38	1.01	41	1.09
Jersey City, N. J	4	.12	1	.03
Kansas City, Mo	39	.93	6	.14
Los Angeles, Calif	435	3.04	360	2.52
Louisville, Ky	328	10.12	175	5.40
Memphis, Tenn	146	5.47	60	2.25
Milwaukee, Wis	1	.02	9	.15
Minneapolis, Minn	72	1.48	79	1.62
Newark, N. J	212	4.57	105	2.27
New Orleans, La	72	1.50	53	1.11
New York, N. Y	5,988	8.20	1,020	1.40
Oakland, Calif	25	.82	29	.96
Omaha, Nebr	7	.32	10	.45
Philadelphia, Pa	260	1.31	50	.25
Pittsburgh, Pa	62	.91	15	.22
Portland, Oreg.[5]				
Providence, R. I	61	2.35	21	.81
Rochester, N. Y	25	.74	27	.80
St. Louis, Mo	198	2.37	102	1.22
St. Paul, Minn	43	1.52	29	1.03
San Antonio, Tex.[1]				
San Francisco, Calif	115	1.71	137	2.04
Seattle, Wash	115	3.03	149	3.92
Syracuse, N. Y	96	4.40	36	1.65
Toledo, Ohio	40	1.31	28	.92
Washington, D. C.[7]	181	3.64	148	2.98

[1] Not reporting.
[2] Incomplete.
[3] Includes only those cases that enter the clinics conducted by the State department of health.
[4] Only cases of syphilis in the infectious stage are reported.
[5] No report for current month.
[6] Reported by the Jefferson Davis Hospital; physicians are not required to report venereal diseases.
[7] Reported by the Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 13, 1936

This tables summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Maine:											
Portland	0	-------	0	293	5	4	0	0	0	2	27
New Hampshire.											
Concord	0	-------	0	0	2	0	0	0	0	0	6
Manchester	0	-------	0	0	0	3	0	0	0	0	9
Nashua	0	-------	-------	3	-------	0	0	-------	0	0	-------
Vermont:											
Barre	0	-------	0	1	0	2	0	0	0	1	-------
Burlington	0	-------	0	33	0	0	0	0	0	3	14
Rutland	0	-------	0	5	0	1	0	0	0	0	2
Massachusetts:											
Boston	4	-------	1	302	22	68	0	9	0	47	225
Fall River	0	-------	0	2	4	4	0	0	0	0	29
Springfield	0	-------	0	2	2	0	0	2	0	0	32
Worcester	1	-------	0	113	3	7	0	4	0	12	45
Rhode Island:											
Pawtucket	0	-------	0	0	0	0	0	0	0	0	17
Providence	1	-------	0	4	3	15	0	2	0	2	60
Connecticut:											
Bridgeport	0	-------	0	11	1	0	0	1	0	6	32
Hartford	0	-------	0	1	2	3	0	1	0	0	33
New Haven	0	-------	0	2	2	0	0	0	0	28	38
New York:											
Buffalo	0	-------	0	73	11	25	0	9	0	4	165
New York	33	-------	4	1,307	76	271	0	92	6	80	1,399
Rochester	0	-------	0	1	7	5	0	0	0	0	84
Syracuse	0	-------	0	41	1	19	0	1	1	26	35
New Jersey:											
Camden	0	-------	0	10	1	3	0	1	0	3	25
Newark	0	-------	0	30	3	52	0	3	0	24	78
Trenton	0	-------	0	0	1	10	0	0	0	16	26
Pennsylvania:											
Philadelphia	7	1	1	362	25	65	0	30	1	72	427
Pittsburgh	6	2	0	4	14	131	0	8	0	39	126
Reading	0	-------	0	17	2	0	0	0	0	7	26
Scranton	0	-------	-------	0	-------	1	0	-------	0	0	-------
Ohio:											
Cincinnati	7	-------	0	9	5	15	0	8	0	1	118
Cleveland	2	3	0	148	10	69	0	17	0	98	206
Columbus	0	2	2	0	5	2	0	5	0	9	71
Toledo	0	-------	2	11	5	1	0	3	0	29	69
Indiana:											
Anderson	0	-------	0	0	0	14	0	0	0	1	17
Fort Wayne	1	-------	0	1	1	2	0	1	0	0	23
Indianapolis	1	-------	1	4	20	14	0	4	1	11	106
Muncie	0	-------	0	0	1	0	0	1	0	0	10
South Bend	0	-------	0	0	2	3	0	0	0	0	6
Terre Haute	0	-------	0	0	0	0	0	0	0	0	20
Illinois:											
Alton	0	-------	0	0	1	4	0	0	0	2	7
Chicago	29	-------	1	12	27	191	1	46	0	90	688
Elgin	0	-------	0	0	0	2	0	0	0	3	8
Moline	0	-------	1	1	1	4	0	0	0	0	11
Springfield	0	-------	0	0	2	1	0	0	0	0	29
Michigan:											
Detroit	14	-------	2	33	22	225	0	23	1	251	257
Flint	0	-------	0	0	6	2	0	2	0	2	30
Grand Rapids	0	-------	0	6	1	2	0	0	0	4	35
Wisconsin:											
Kenosha	0	-------	0	0	0	13	1	0	0	0	8
Madison	0	-------	0	2	0	1	0	0	0	10	-------
Milwaukee	0	1	1	38	3	91	0	3	0	92	82
Racine	0	-------	0	3	2	7	0	1	0	1	19
Superior	0	-------	0	0	0	1	0	0	0	0	8
Minnesota:											
Duluth	0	-------	0	10	2	12	0	1	0	4	23
Minneapolis	0	-------	0	60	1	47	0	3	0	7	113
St. Paul	0	-------	0	91	6	19	0	1	0	7	55

City reports for week ended June 13, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0			1		1	0		0	5	
Davenport	0			0		4	0		0	0	
Des Moines	0			0		9	0		0	0	31
Sioux City	1			1		15	12		0	0	
Waterloo	0			2		3	0		0	0	
Missouri:											
Kansas City	2		0	3	5	38	0	3	0	0	112
St. Joseph											
St. Louis	10		0	7	6	32	0	4	3	15	201
North Dakota:											
Fargo	0		0	0	0	1	0	0	0	0	4
Grand Forks	0			0		0	0		0	0	
Minot	0			2		5	0		0	0	5
South Dakota:											
Aberdeen	0			0		3	0		0	0	
Sioux Falls	0			0		0	0		0	0	5
Nebraska:											
Omaha	1		0	14	2	18	5	1	0	1	48
Kansas:											
Lawrence	0		0	0	0	2	0	0	0	0	5
Topeka											
Wichita	0		1	1	1	7	0	0	0	0	26
Delaware:											
Wilmington	0		0	3	5	0	0	2	0	4	28
Maryland:											
Baltimore	4		1	247	13	19	0	8	0	73	201
Cumberland	0		0	0	1	0	0	0	0	0	6
Frederick	0		0	0	0	0	0	0	0	0	6
District of Col.:											
Washington	7		0	125	8	11	0	12	0	12	153
Virginia:											
Lynchburg	0		0	0	0	0	0	1	0	7	11
Norfolk	2		0	0	4	0	0	1	0	0	27
Richmond	0		0	1	9	12	0	3	0	0	64
Roanoke	0		0	0	0	1	0	0	0	0	15
West Virginia:											
Charleston	0		0	1	2	0	0	2	1	0	38
Huntington	0		0	0	0	1	0	0	0	0	
Wheeling	0		0	20	1	0	0	1	0	0	10
North Carolina:											
Gastonia	0		0	2	0	0	0	0	0	0	
Raleigh	0		0	0	2	0	0	2	0	2	17
Wilmington	0		0	0	0	0	0	0	0	1	8
Winston-Salem	0		0	3	1	0	0	0	0	0	10
South Carolina:											
Charleston	0	3	0	0	2	0	0	0	0	0	13
Columbia											
Florence	0		0	0	2	0	0	0	0	0	14
Georgia:											
Atlanta	0		0	1	8	5	0	6	2	0	74
Brunswick	0		0	0	0	0	0	0	0	0	4
Savannah	0		0	0	0	0	0	1	1	1	34
Florida:											
Miami	0		7	1	0	0	0	1	0	2	21
Tampa	0		0	6	1	0	0	1	0	0	21
Kentucky:											
Ashland	0		0	2	0	0	0	0	0	0	2
Covington	0		0	2	3	1	0	0	0	0	17
Lexington	0		0	2	2	2	0	5	0	0	21
Louisville	1		0	12	5	12	0	1	0	5	86
Tennessee:											
Knoxville	0		0	2	4	1	0	1	2	0	34
Memphis	0		0	1	4	2	0	8	0	11	77
Nashville	0		1	4	5	2	0	4	1	0	64
Alabama:											
Birmingham	0		0	0	3	1	0	2	0	0	65
Mobile	0		1	0	2	1	0	3	0	0	21
Montgomery	0			0		0	0		1	0	
Arkansas:											
Fort Smith	0			0		3	0		0	0	
Little Rock	0		1	0	1	0	0	2	0	0	4
Louisiana:											
Lake Charles	0		0	1	2	0	0	0	0	1	12
New Orleans	5	4	3	0	15	0	0	15	0	3	172
Shreveport	0		0	3	8	0	0	3	1	0	45

City reports for week ended June 13, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Oklahoma City	2	6	1	8	5	4	0	1	0	3	54
Tulsa	0	0		1		0	0		0	0	
Texas:											
Dallas	4		0	33	2	1	0	0	0	0	61
Fort Worth	0		0	4	3	2	0	4	0	0	48
Galveston	0		0	3	1	0	0	0	1	0	15
Houston	2		0	0	7	2	0	9	1	0	88
San Antonio	1		1	3	6	0	0	4	0	0	84
Montana:											
Billings	0		0	1	0	4	0	1	0	0	7
Great Falls	0		0	0	0	0	0	0	0	0	9
Helena	0		0	0	0	5	0	0	0	0	5
Missoula	0		0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0		0	1	1	0	0	0	0	0	9
Colorado:											
Colorado Springs	0		0	2	1	4	0	1	0	0	15
Denver	1		1	15	2	9	0	5	0	31	68
Pueblo	0		0	0	2	4	0	0	0	1	8
New Mexico:											
Albuquerque	0		0	21	2	4	0	4	0	2	23
Utah:											
Salt Lake City	0		0	15	0	13	3	2	0	9	25
Nevada:											
Reno											
Washington:											
Seattle	0		0	129	0	8	1	4	0	10	74
Spokane	0		0	15	4	27	0	0	1	4	41
Tacoma	0		0	14	0	0	0	3	0	5	35
Oregon:											
Portland	0		0	2	4	9	0	2	0	7	68
Salem	0	1		12		0	0		0	0	
California:											
Los Angeles	9	6	0	164	19	44	0	16	1	66	310
Sacramento	1		0	1	0	22	0	2	3	26	27
San Francisco	1		0	88	3	75	0	10	0	25	182

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Nebraska:			
Boston	4	2	1	Omaha	1	0	0
Worcester	2	1	1	Maryland:			
Connecticut:				Baltimore	2	0	0
Bridgeport	1	2	0	District of Columbia:			
New York:				Washington	3	1	0
New York	10	4	0	Virginia:			
Syracuse	1	0	0	Richmond	1	0	0
Pennsylvania:				West Virginia:			
Philadelphia	1	1	0	Huntington	1	0	0
Pittsburgh	3	1	0	Tennessee:			
Ohio:				Memphis	0	1	0
Cincinnati	3	3	0	Alabama:			
Columbus	1	0	0	Birmingham	2	0	0
Illinois:				Louisiana:			
Chicago	1	2	0	New Orleans	3	0	0
Michigan:				Shreveport	0	2	0
Detroit	1	1	0	Oklahoma:			
Grand Rapids	1	0	0	Tulsa	1	0	0
Minnesota:				Texas:			
Minneapolis	2	0	0	Houston	2	0	0
Missouri:				California:			
Kansas City	1	0	0	Los Angeles	3	0	1

Epidemic encephalitis.—Cases: Cleveland, 1; Milwaukee, 1; Baltimore, 1.
Pellagra.—Cases: Detroit, 1; Baltimore, 3; Winston-Salem, 2; Charleston, S. C., 4; Savannah, 9; Miami, --Memphis, 2; San Francisco, 2.
Typhus fever.—Cases: Charleston, S. C., 1; Fort Worth, 1.

FOREIGN AND INSULAR

JAMAICA

Communicable diseases—4 weeks ended June 13, 1936.—During the 4 weeks ended June 13, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	2	4	Puerperal fever		2
Diphtheria		1	Scarlet fever		1
Dysentery	7	9	Tuberculosis	40	86
Erysipelas		1	Typhoid fever	9	72
Leprosy	1	3			

SPAIN

Vital statistics—1935.—The following table shows the number of births and deaths, together with death rates from certain causes, reported in Spain during 1935.

Population, estimated Dec. 31, 1934	24,583,096
Number of deaths	383,935
Death rate per 1,000 population	15.62
Number of births	631,561
Birth rate per 1,000 population	25.69
Stillbirths	21,734
Infant mortality per 1,000 live births	109

Death rates per 100,000 population from—	
Bronchitis	63.9
Diarrhea and enteritis	165.0
Diphtheria	5.0
Measles	9.5
Pneumonia	167.0
Scarlet fever	2.4
Tuberculosis, pulmonary	85.7
Tuberculosis, other forms	22.3
Typhoid and paratyphoid fever	11.3
Whooping cough	4.2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 26, 1936, pages 858-870. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Bombay.—During the week ended June 6, 1936, 1 imported case of cholera with 1 death was reported at Bombay, India.

Plague

Ecuador.—During the month of May 1936, 2 suspected cases of plague were reported in the mountain region along the railroad to Quito, Ecuador.

Egypt—Suez.—During the week ended June 6, 1936, 1 case of plague was reported at Suez, Egypt.

United States—California.—A report of plague-infected ground squirrels in California appears on page 890 of this issue of PUBLIC HEALTH REPORTS.

Yellow Fever

Brazil—Sao Paulo State.—Yellow fever has been reported in Sao Paulo State, Brazil, as follows: May 17, 1936, 1 case and 1 death at Casa Branca; May 19, 1936, 1 case and 1 death at Tambahu; May 5, 1936, 1 case and 1 death at Pennapolis.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease: (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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HISTORY AND FREQUENCY OF TYPHOID FEVER IMMUNIZATIONS AND CASES IN 9,000 FAMILIES

Based on Nation-Wide Periodic Canvasses, 1928–31[1]

By SELWYN D. COLLINS, *Principal Statistician, United States Public Health Service*

CONTENTS

Typhoid fever vaccine was developed during the nineties, and was first used on man in England and Germany in 1896 (20, 23). It was used to a considerable extent in the British Army in India in 1898, to some extent among the British troops in the Boer War, and in the German Colonial Army in South Africa from 1904 to 1907 (23). In 1911 typhoid vaccination was made compulsory for men under 45 years of age throughout the United States Army (23) and Navy (16). During the years of the World War, several million persons who served in the Army and Navy received injections of vaccine for protection against typhoid and paratyphoid A and B (23).

The use of typhoid vaccine in the civilian population has been much less frequent; aside from wholesale immunizations in certain Southern States under Federal appropriations for the protection of health in areas stricken in 1927 by the floods and in 1930 by the drought, no widespread movement has been made to carry this protective procedure to the civilian population.

The typhoid fever death rate per 100,000 population in the registration States[2] of 1900 decreased from 31.3 in 1900 to 1.1 in 1933. In

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

This is the eighth of a series of papers on sickness and medical care in this group of families (1–7). The survey of these families was organized and conducted by the Committee on the Costs of Medical Care; the tabulation was done under a cooperative arrangement between the Committee and the Public Health Service. Committee publications based on the results deal primarily with costs and Public Health Service publications primarily with the incidence of illness, and the extent and kind of medical care, without regard to cost. As costs are meaningless without some knowledge of the extent and nature of the service received, there is inevitably some overlapping. The Committee staff, particularly Dr. I. S. Falk and Miss Margaret Klem, cooperated in the tabulation of the data.

Special thanks are due to Dr. Mary Gover, who assisted in the analysis, to Miss Lily Vanzee, who was in immediate charge of tabulating the data, and to other members of the statistical staff of the Public Health Service, particularly Dr. W. M. Gafafer, for advice and assistance in the preparation of the study.

[2] The registration States of 1900 include Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Michigan, Indiana, and the District of Columbia. The rate for the total continental United States was 3.6 in 1933 and 3.4 in 1934.

some large cities with efficient water purification and milk pasteurization the rate is even lower than this figure. In this spectacular decline the use of typhoid immunization apparently had little or no part, and there has recently been considerable discussion as to whether typhoid vaccination is effective in preventing typhoid fever in an individual.

On the question of the efficacy of typhoid vaccine this paper has nothing to offer. Regardless of the usefulness of the procedure, however, it is of interest to determine the extent to which the population of various parts of the United States have received the injections.

I. SOURCE AND CHARACTER OF DATA

In the study of illness in canvassed white families in 130 localities in 18 States [3] that was made by the Committee on the Costs of Medical Care and the United States Public Health Service, all service received from physicians and other practitioners was recorded, whether for illness, immunization, physical examination, or some other reason. The records of immunization [4] against typhoid fever for all persons in the observed population afford data on the frequency of this procedure during 12 months covered by periodic canvasses; information was also obtained on the history of typhoid fever immunization and cases at any time prior to the study. Because the probability of having received the immunizing injections prior to a given date is influenced greatly by the number of years the person has lived, the histories in this study are considered for persons of specific ages.

The composition and characteristics of the group of 8,758 families which were kept under observation for 12 consecutive months in the years 1928–31 have been considered in some detail in the first report in the series (1). These families, including a total of 39,185 individuals, resided in 18 States, representing all geographic sections. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas. The observed group was similar to the general population with respect to age and sex composition, percentage native born, and percentage married. With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey.

Every locality included had a visiting nurse and a local health department or some other agency employing a visiting nurse. This

[3] The 18 States sampled and the number of canvassed families were as follows: California (890), Colorado (386), Connecticut (100), District of Columbia (99), Georgia (544), Illinois (463), Indiana (494), Kansas (701), Massachusetts (287), Michigan (329), Minnesota (224), New York (1,710), Ohio (1,148), Tennessee (212), Virginia (412), Washington (551), West Virginia (318), Wisconsin (250). Further details about the distribution of the canvassed population are included in a preceding paper (1).

[4] Typhoid fever "immunization" is used in this paper to mean the injection of the usual number of doses of typhoid fever vaccine; all cases receiving such service are designated as "immunizations".

condition is inherent in the method of the study, which required, among other things, that local visiting nurses from health departments or other agencies make the canvasses of the homes to secure the data. In such communities a larger percentage of the population may have received the immunizing injections than in those without health organizations. On the other hand, since the report for the whole family was made by the housewife or some other adult female, the record of immunizations may be less complete than could be obtained by the questioning of individuals. However, the canvasses were periodic and corrections or additional information could be secured at subsequent visits.

TABLE 1.—*History of typhoid fever immunizations and cases among persons of specific ages of each sex—canvassed white families in 18 States* [1]

Age in years	Both sexes: Percentage of persons with history of—: Immunization or case at any time	Both sexes: Percentage of persons with history of—: Immunization at any time but no case	Both sexes: Percentage of persons with history of—: Case at any time	Both sexes: Total number of persons considered [2]	Percentage of persons with history of—: Immunization at any time but no case: Male	Percentage of persons with history of—: Immunization at any time but no case: Female	Percentage of persons with history of—: Case at any time: Male	Percentage of persons with history of—: Case at any time: Female	Total number of persons considered [2]: Male	Total number of persons considered [2]: Female
All ages	11.79	7.53	4.26	37,846	8.93	6.17	4.35	4.18	18,567	19,279
Under 1	.33	.33	.06	919	.22	.90	--------	.11	915	892
1	.90	.79		888						
2	1.25	1.25	.05	1,044	1.83	1.74	--------	.10	1,093	1,034
3	2.40	2.31		1,083						
4	2.74	2.65	.17	1,132	3.52	3.10	.35	--------	1,138	1,163
5	4.19	3.93		1,169						
6	5.01	4.49	.43	1,158	5.41	4.46	.25	.61	1,184	1,144
7	5.73	5.39		1,170						
8	7.22	6.22	1.00	1,204	6.78	6.67	1.21	.79	1,076	1,134
9	8.25	7.26		1,006						
10-14	9.37	8.17	1.20	4,567	8.09	8.25	1.26	1.15	2,300	2,267
15-19	12.47	10.04	2.43	3,040	11.09	8.97	2.62	2.24	1,524	1,516
20-24	11.03	7.93	3.70	2,109	9.54	6.75	3.70	3.70	892	1,217
25-29	12.98	7.99	4.99	2,483	14.92	6.81	4.60	5.97	2,393	3,233
30-34	17.75	12.05	5.70	3,143						
35-44	19.68	11.95	7.73	5,923	15.58	8.29	7.84	7.63	2,978	2,950
45-54	17.07	7.46	9.61	3,351	8.17	6.59	9.85	9.31	1,848	1,503
55-64	16.45	4.30	12.15	1,465	3.82	2.78	13.00	10.11	1,231	1,226
65 and over	12.54	1.85	10.69	992						

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

[2] A few individuals known as to case history were unknown as to immunization history (14 out of the 37,846 persons); the rates in every instance are based on the known only.

II. HISTORY OF IMMUNIZATIONS AND CASES AT BEGINNING OF STUDY

VARIATION WITH AGE AND SEX

Figure 1 shows for specific ages the proportion of individuals who had been artificially immunized against typhoid and who had suffered attacks of typhoid fever at any time in their lives (table 1). In the younger ages, up to 15 years, the percentages who had received immunizing injections amount to far more than the percentages who

had been attacked by the disease. As age increases above 20 years, the proportion who had been attacked rises rather rapidly to nearly 8 percent at 35–44 years and to 12 percent at 55–64 years. This increase with age represents more than the increased probability of having had the disease as the number of years lived increases. Because typhoid fever was formerly more prevalent than at present, those persons who are now 40 and 50 years of age have lived through a period when the incidence of typhoid fever was extremely high, whereas the lives of the younger persons have been lived in an environment where less opportunity for infection existed.

The proportion of individuals who had been immunized against typhoid fever reaches 10 percent at 15–19 years of age; there is a decline to 8 percent for individuals 20–24 and 25–29 years, with another increase to 12 percent at 30–34 and 35–44 years of age. Be-

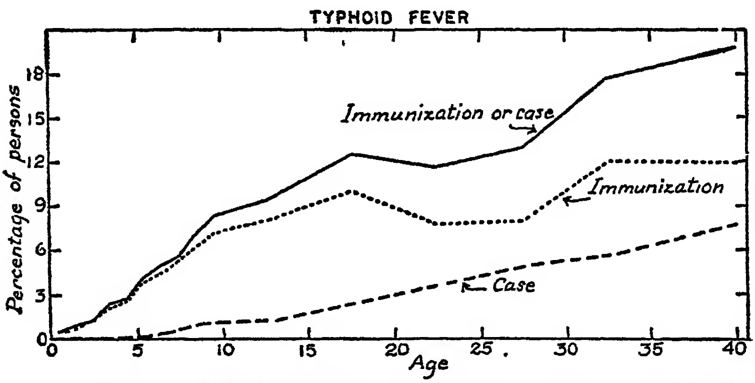

FIGURE 1.—Percentage of persons of specific ages (a) who had been immunized and (b) who had suffered an attack of typhoid fever—8,758 canvassed white families in 18 States, 1928–31.

yond 45 years the percentage declines as age increases. These variations are probably not due to chance. The peak in the late school ages reflects the ease with which the health department can apply immunizing procedures to children in schools. The plateau extending to 45 years reflects immunizations during the World War of men then in the military ages.

Considering all ages, 13.3 percent of the males and 10.4 percent of the females gave a history of immunization or a case of typhoid fever at some time in their lives. These percentages were made up of 8.9 and 6.2 for males and females, respectively, who had been immunized but had not suffered attacks, and 4.4 and 4.2 percent of males and females, respectively, who gave a history of an attack of typhoid fever. These data are shown for specific ages in table 1 and figure 2. With respect to the history of typhoid fever, there are no consistent differences between the sexes under 8 years of age, but from 8 to 20 the rate for males is slightly above that for females;

above 25 years the differences between the sexes are not consistent in the various ages.

For comparison with results in the present study, table 2 shows reports from male and female students in 11 colleges and universities (26), each person reporting his own typhoid history only. In these data the males report more attacks than females. The history rates for males in the present study may be low, because the women were usually the informants.

With respect to immunization histories in the surveyed families (fig. 2), no consistent differences between the sexes appear under 15

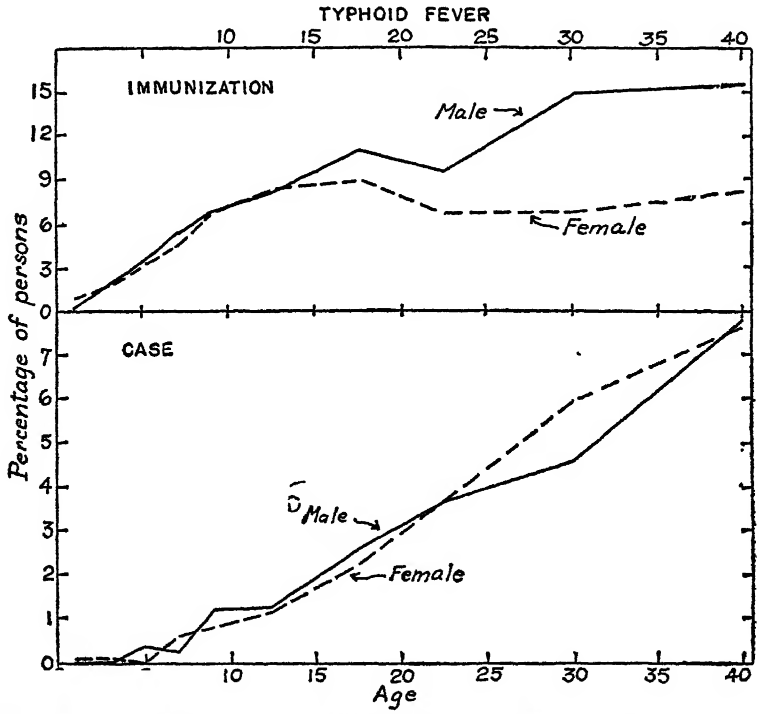

FIGURE 2.—Percentage of males and females of specific ages (a) who had been immunized and (b) who had suffered an attack of typhoid fever—8,758 canvassed white families in 18 States, 1928–31.

years, but above that age there are definitely more immunizations among males of every age group. The large differences from 25 to 44 years are no doubt the result of the immunization of males who were in the military services during the World War—there is no increase with age during these years in the curve for females. Probably the differences between the sexes are even greater than the data indicate, because women were usually the informants and would know their own histories better than those of others in the household. The excess in immunizations among males of the ages 15 to 25 is not so easily explained; one factor may be compulsory immunization of

male college students in the Reserve Officers' Training Corps and of males in the citizens' military training camps during the summer.

TABLE 2.—*History of typhoid fever cases at any time among male and female students in various universities,*[1] *1925*

	All ages	17–18	19–20	21–22	23–24	25–29	30–34	35–39	40 and over
	Percentage of students who had suffered an attack								
Both sexes	7.2	4.8	3.9	7.2	5.7	10.0	9.5	21.0	18.6
Male	8.2	5.4	4.1	8.2	5.3	10.3	11.0	22.4	21.7
Female	5.8	4.4	3.8	5.9	6.9	8.6	5.7	18.8	14.3
	Total number of students reporting								
Both sexes	4,718	313	1,396	1,093	635	722	252	124	183
Male	2,787	130	629	618	475	571	182	76	106
Female	1,931	183	767	475	160	151	70	48	77

[1] The group considered made the reports at the end of the U S Public Health Service study of respiratory diseases (26), it included students in 11 colleges and universities throughout the country The universities included are Harvard (Boston), Mount Holyoke College (South Hadley, Mass), Johns Hopkins (Baltimore), Georgetown (Washington, D. C.), Wintrop College (Rock Hill, S. C), Tulane (New Orleans), Chicago (Chicago), Ohio State (Columbus), Utah (Salt Lake City), Arizona (Tucson), and California (Berkeley).

VARIATION IN THE FREQUENCY OF A HISTORY OF IMMUNIZATION WITH SIZE OF CITY AND GEOGRAPHIC LOCATON

The proportion of persons who have been immunized against typhoid fever might be expected to vary from one community to another, depending upon the nature and extent of the typhoid fever problem and the practices of health departments and private physicians.

Cities and rural areas.—In figure 3 the proportions of persons of specific ages who had been immunized are plotted for cities of various sizes and for rural areas (table 3). The rural areas show the highest rates for the history of immunization against typhoid; in the group of persons living on farms or in unincorporated places, the percentage of individuals who had been immunized is one and one-half to two times that in the small towns and small cities for each of the ages up to 25 years. The lowest immunization history rates appear for families living in large cities; nearly all cities of 100,000 and over have good water supplies and require pasteurization of milk, and so there is little occasion for immunization except for vacations or other trips into the less-protected rural areas.

The lower section of figure 3 shows for the same size of city groups the proportion of persons of specific ages who gave a history of an attack of typhoid fever (table 4). While the differences are not large, the rural areas show consistently fewer histories of typhoid attacks than the small towns and generally fewer than the small cities, in agreement with the findings of Leach and Maxcy (21) with

regard to typhoid fever cases and deaths in Alabama. However, the large cities (over 100,000) are definitely lower than any of the other categories, in agreement with the results of Milam and Sibley (22) on typhoid fever deaths in Tennessee. This low case-history rate reflects the relatively high sanitary status of the metropolitan areas and is no doubt the reason for their low immunization rates.

TABLE 3.—*History of typhoid fever immunizations among persons in cities of various sizes and in rural areas—canvassed white families in 18 States* [1]

Age in years	Percentage of persons with a history of—								Total number of persons considered			
	Immunization or case at any time				Immunization at any time but no case							
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
All ages	8.6	12.7	13.5	15.2	5.3	8.0	8.1	10.9	14,087	9,527	7,445	6,787
Under 5	.3	1.2	1.4	5.5	.2	1.1	1.4	5.5	1,799	1,420	1,032	815
5–9	1.7	6.3	7.3	12.8	1.2	5.4	6.5	12.7	1,993	1,515	1,197	1,002
10–14	3.7	9.4	10.6	17.4	2.9	7.8	9.0	16.3	1,577	1,105	909	976
15–19	7.9	13.1	14.6	16.9	6.2	10.3	10.9	14.8	1,035	756	569	680
20–24	6.8	12.7	14.0	18.8	4.1	9.2	9.0	14.1	863	503	360	383
25–34	12.8	17.8	18.4	16.4	8.7	11.4	12.6	11.0	2,361	1,427	1,096	742
35–44	16.3	22.9	22.6	19.4	10.1	13.8	12.5	11.6	2,305	1,508	1,133	977
45–54	15.5	17.8	19.9	16.5	8.3	7.4	6.2	7.1	1,247	803	628	673
55 and over	11.8	17.7	17.3	15.2	3.5	4.8	3.1	1.8	907	490	521	539

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

TABLE 4.—*History of typhoid fever cases among persons in cities of various sizes and in rural areas—canvassed white families in 18 States* [1]

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
All ages	3.3	4.7	5.4	4.3	469	448	400	295	14,087	9,527	7,445	6,787
Under 5	.1	.1	-------	------	2	1	-------	------	1,799	1,420	1,032	815
5–9	.6	.9	.8	.1	11	14	9	1	1,993	1,515	1,197	1,002
10–14	.8	1.6	1.5	1.1	12	18	14	11	1,577	1,105	909	976
15–19	1.7	2.8	3.7	2.1	18	21	21	14	1,035	756	569	680
20–24	2.8	3.6	5.0	4.7	24	18	18	18	863	503	360	383
25–34	4.5	6.4	5.8	5.4	107	92	64	40	2,361	1,427	1,096	742
35–44	5.7	9.1	10.1	7.8	131	137	114	76	2,305	1,508	1,133	977
45–54	7.1	10.5	13.7	9.4	89	84	86	63	1,247	803	628	673
55 and over	8.3	12.9	14.2	13.4	75	63	74	72	907	490	521	539

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

Geographic location.—The 18 States in which the surveyed population lived may be divided into 4 geographic sections, the *Northeast* (New York, Massachusetts, Connecticut), representing the New England and Middle Atlantic States; the *North Central* (Illinois,

Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas), representing the North Central States; the *South* (District of Columbia, Virginia, West Virginia, Tennessee, Georgia), representing the South Atlantic and South Central States; and the *West* (Colorado, California, Washington), representing the Mountain and Pacific States.[5]

In figure 4 immunization history rates have been plotted for each of the four geographic sections of the United States (table 5). The South stands far above all other sections in the use of immunization

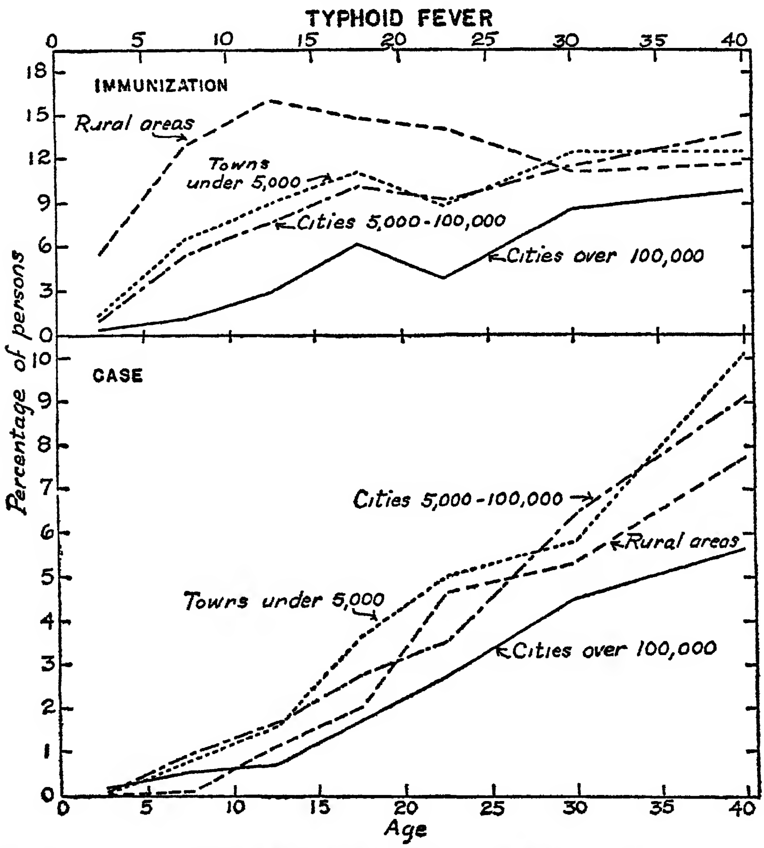

FIGURE 3.—Percentage of persons of specific ages in cities and rural areas (a) who had been immunized and (b) who had suffered an attack of typhoid fever—8,758 canvassed white families in 18 States, 1928–31.

against typhoid fever. Probably this showing is not the result solely of consistent efforts year after year to immunize as many persons as possible, but is also a reflection of wholesale immunizations done by State and county health departments under special grants from the Federal Government in the emergency following the widespread flood conditions of 1927 (ref. 14 for 1928). Large numbers of persons were

[5] Further details regarding the number of families from each State and each size of city are included in a previous paper (1).

also immunized in 1931 and 1932 in the work following the drought [6] of 1930, but most of the schedules taken for the present study in the

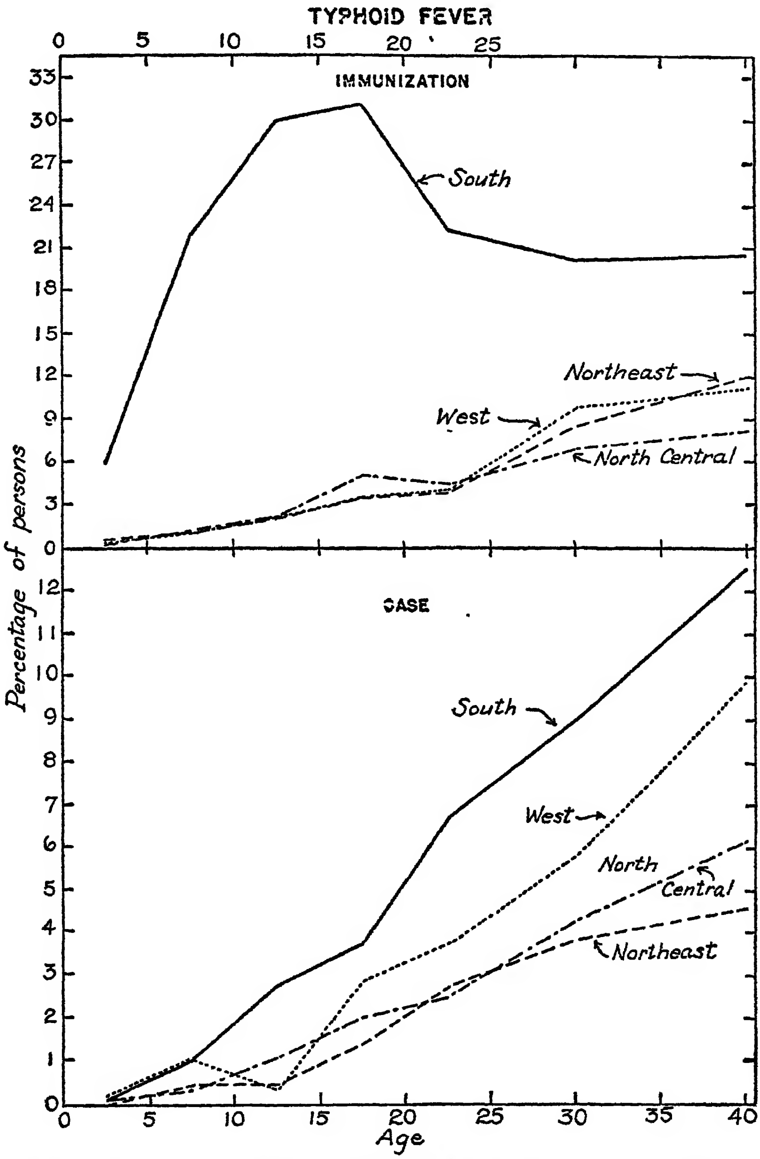

FIGURE 4.—Percentage of persons of specific ages in four geographic sections (a) who had been immunized and (b) who had suffered an attack of typhoid fever—8,758 canvassed white families in 18 States, 1928–31.

Southern States cover 12 months ending in the winter of 1929–30, and so would not reflect much of the work following this drought.

[6] A total of more than 1,000,000 typhoid fever immunizations were done in the drought work of 1931–32, mostly in Southern States (ref. 14 for 1932, 18).

The objective in all the emergency work was to immunize persons of all ages, but the curve that appears in figure 4 indicates that children of the school ages were reached to a greater extent than adults, as might be expected, because of the ease of working through the schools. The low history for children under 5 years may reflect not only the reluctance to immunize at an early age but also the birth of infants after the flood year, when the widespread immunizations were done.

TABLE 5.—*History of typhoid fever immunizations among persons in four geographic sections* [1] *of the United States—canvassed white families in 18 States* [2]

Age in years	Percentage of persons with a history of—								Total number of persons considered			
	Immunization or case at any time				Immunization at any time but no case							
	Northeast	North Central	South	West	Northeast	North Central	South	West	Northeast	North Central	South	West
All ages	8.2	7.4	25.8	10.0	5.2	4.0	19.7	4.6	8,874	14,198	7,594	7,180
Under 5	.5	.2	6 1	.4	.5	.2	6.0	.2	1,149	1,984	1,112	821
5–9	1.6	1.5	22.7	2 0	1.1	1.2	21.7	.9	1,278	2,273	1,189	967
10–14	2.5	3.2	32 7	2.6	2.0	2 1	29.9	2.2	1,053	1,731	1,001	782
15–19	4.9	7.0	34 9	6 4	3 5	5.0	31.1	3.5	715	1,036	662	627
20–24	6.3	7.0	29.0	7.7	3.6	4.5	22.3	4.0	474	758	447	430
25–34	12 2	11.2	29 1	15.5	8 4	6 9	20.1	9.7	1,217	2,301	1,076	1,032
35–44	16.5	14.3	32 9	21.0	12 0	8 2	20.4	11.2	1,356	2,267	1,125	1,175
45–54	15.8	13.4	29 2	15.0	9.9	4.0	16.4	3.1	892	1,118	566	775
55 and over	12.7	13.8	30.9	14.5	3.3	2.6	6.2	2.1	740	730	416	571

[1] A preceding paper (1) gives the number of families canvassed in each State classified according to the size of the city of residence. States included in the survey were as follows:
Northeast: New York, Massachusetts, Connecticut.
North Central: Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas.
South: District of Columbia, Virginia, West Virginia, Tennessee, Georgia.
West: Washington, California, Colorado.

[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

The Northeastern, the North Central, and the Western sections show about the same proportion of individuals immunized, all being far below the South.

The lower part of figure 4 shows for the different geographic sections the percentage of persons of specific ages who had suffered attacks of typhoid fever (table 6). The South shows the highest history rates for typhoid fever cases, the West second, and the North Central and Northeast the lowest rates, with approximately the same curves. Thus it appears that, in the South, where typhoid fever has been the greatest problem, there has been a greater resort to immunization in an attempt to control the disease. The West, however, has not resorted to immunization even in the face of relatively high history rates for typhoid fever. The more common use of typhoid immunization in the South may reflect the special health work done after flood conditions rather than an acceptance of immunization as a permanent method of controlling the typhoid problem.

TABLE 6.—*History of typhoid fever cases among persons in four geographic sections [1] of the United States—canvassed white families in 18 States [2]*

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	Northeast	North Central	South	West	Northeast	North Central	South	West	Northeast	North Central	South	West
All ages	3.0	3.5	6.1	5.4	266	492	467	387	8,874	14,198	7,594	7,180
Under 5	-------	.1	.1	.1	-------	1	1	1	1,149	1,984	1,112	821
5–9	.5	.3	1.0	1.0	6	7	12	10	1,278	2,273	1,189	967
10–14	.5	1.1	2.8	.4	5	19	28	3	1,053	1,731	1,001	782
15–19	1.4	2.0	3.8	2.9	10	21	25	18	715	1,036	662	627
20–24	2.7	2.5	6.7	3.7	13	19	30	16	474	758	447	430
25–34	3.9	4.3	9.0	5.8	47	99	97	60	1,217	2,301	1,076	1,032
35–44	4.6	6.1	12.5	9.9	62	139	141	116	1,356	2,267	1,125	1,175
45–54	5.9	9.4	12.7	11.9	53	105	72	92	892	1,118	566	775
55 and over	9.5	11.2	14.7	12.4	70	82	61	71	740	730	416	571

[1] For States included in the different geographic sections, see footnote 1 to table 5.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

For comparison with results in the present study, table 7 shows typhoid histories among students in 11 colleges and universities (26), classified according to the individual's home State. A higher percentage of the students from the South reported a history of an attack of typhoid, in agreement with the present study. Typhoid mortality and reported cases (table 18) both indicate that typhoid fever is more common in the South in the white as well as in the colored population.

TABLE 7.—*History of typhoid fever cases at any time among students in various universities classified according to the student's "home State", 1925 [1]*

Section [2]	Percentage of students who had suffered an attack of typhoid						Total number of students reporting					
	All ages	17–19	20–24	25–29	30–34	35 and over	All ages	17–19	20–24	25–29	30–34	35 and over
Northeast	4.8	4.5	3.1	6.8	4.4	12.5	964	201	478	176	45	64
North Central	8.0	2.5	8.0	10.6	6.6	17.2	1,369	239	695	236	106	93
South	12.2	6.9	7.5	13.3	21.3	25.0	748	116	320	143	61	108
West	5.4	4.7	4.8	9.0	5.7	15.6	1,549	364	978	145	35	32

[1] The group considered made the reports at the end of the U. S. Public Health Service study of respiratory diseases (26); it included the students in 11 colleges and universities throughout the country. The total of 4,718 persons reporting on typhoid fever included 2,787 males and 1,931 females; 88 persons who did not designate their home State are excluded from this table. The universities included are Harvard (Boston), Mount Holyoke College, (South Hadley, Mass.), Johns Hopkins (Baltimore), Georgetown (Washington, D. C.), Winthrop College (Rock Hill, S. C.), Tulane (New Orleans), Chicago (Chicago), Ohio State (Columbus), Utah (Salt Lake City), Arizona (Tuscon), and California (Berkeley).
[2] In terms of the geographic areas used in the U. S. Census reports, the four sections include the following areas:
Northeast: New England and Middle Atlantic.
North Central: East and West North Central.
South: South Atlantic and East and West South Central.
West: Mountain and Pacific.

Cities and rural areas in each geographic section.—Figure 5 shows the percentage of individuals of all ages who had been immunized and the percentage who had suffered attacks of typhoid fever in cities of different sizes in each of the four geographic regions. The

percentages have been adjusted for differences in the age distribution of the population under consideration. Immunization histories in the large cities are not much more frequent in the South than in other sections; but in small cities, and particularly in towns and rural areas, there are large excesses in immunization rates for the South. In the rural areas, few immunizations have been done in any section except the South (table 8).

In the history of attacks of typhoid fever which is shown in the left half of figure 5, the rates for all four city-rural categories are higher in the South than in other sections except small cities and

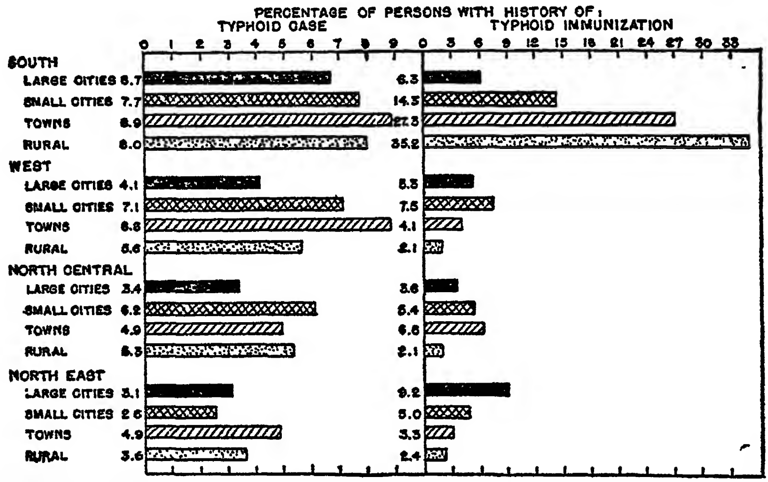

FIGURE 5.—Percentage of persons in metropolitan, urban, and rural parts of four geographic sections (a) who had been immunized and (b) who had suffered an attack of typhoid fever—8,758 canvassed white families in 18 States, 1928–31. (Rates adjusted to the age distribution of the white population of the registration States, 1930.)

towns of the West (table 9). In three of the four sections the history rate is somewhat lower for rural areas than for small towns, in agreement with the findings of Leach and Maxcy (21).

III. IMMUNIZATIONS AND CASES DURING THE 12-MONTH STUDY

The record of all medical care, whether for illness or preventive service, affords accurate data on the frequency of immunizations against typhoid fever during the 12 months of the morbidity study. The histories of prior immunization refer to the whole life of the individual, and the resulting percentages tend to average out the periods of high and low immunization rates. The record for the one year, although more accurate than the history data, may represent more frequent or less frequent immunizations than the average over a period of years. Even the average over a period of years may not represent the true expectancy of immunizations; this is particularly true of typhoid immunizations in the South, where Federal

aid in certain emergencies resulted in more immunizations than would be expected in normal years.

TABLE 8.—*History of typhoid fever immunizations among persons in metropolitan, urban, and rural parts of 4 geographic sections*[1] *of the United States—canvassed white families in 18 States*[2]

Age in years	Percentage of persons with a history of—								Total number of persons considered[2]			
	Immunization or case at any time				Immunization at any time but no case							
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
	Northeast[1]											
All ages	11.6	6.7	7.3	5.3	9.1	4.6	3.2	2.2	2,873	1,831	2,416	1,754
Under 5	.3	--------	.6	1.4	.3	--------	.6	1.4	313	255	303	218
5-9	1.9	1.9	.9	1.6	1.0	1.9	.6	1.2	424	260	344	250
10-14	3.1	3.9	1.9	.5	2.5	8.0	1.1	--------	359	229	266	199
15-19	5.5	7.3	4.6	1.3	4.2	6.8	1.3	.7	238	177	151	149
20-24	5.2	7.2	4.9	8.6	3.9	4.5	1.9	3.8	155	111	103	105
25-44	20.0	10.5	12.9	9.6	16.4	7.2	7.7	4.7	938	458	730	447
45 and over	23.3	11.5	13.3	8.0	17.0	5.9	2.2	1.6	446	341	459	386
	North Central[1]											
All ages	6.1	9.4	10.0	5.7	3.4	5.0	6.2	1.8	6,538	3,795	1,863	2,002
Under 5	.2	--------	.4	.4	.1	--------	.4	.4	803	602	239	251
5-9	1.3	2.0	2.8	--------	1.0	1.7	2.2	--------	947	657	341	307
10-14	2.9	5.1	4.1	.3	1.9	3.5	2.3	.3	724	429	267	311
15-19	5.5	9.8	12.3	3.0	4.4	6.3	10.3	1.0	436	254	116	200
20-24	6.7	8.6	7.7	4.9	4.0	6.8	7.7	--------	448	164	65	81
25-44	9.6	16.1	19.1	10.6	5.9	9.2	12.2	5.3	2,179	1,277	583	529
45 and over	11.0	18.2	14.9	14.2	3.3	4.7	5.0	1.6	911	412	202	323
	South[1]											
All ages	11.5	20.3	35.8	45.4	6.0	14.2	28.6	39.1	1,909	2,904	1,152	1,629
Under 5	--------	3.3	7.5	19.3	--------	3.1	7.5	19.3	269	485	146	212
5-9	2.9	14.3	39.1	54.6	2.3	12.7	37.9	54.6	306	482	174	227
10-14	7.3	20.7	44.8	65.6	6.4	17.7	41.1	62.1	253	333	163	253
15-19	17.2	25.2	38.3	57.8	14.6	21.8	34.2	53.0	151	206	120	185
20-24	7.1	21.7	40.8	47.1	3.6	14.5	29.3	42.0	84	106	78	119
25-44	19.5	30.4	40.2	44.4	8.5	19.7	29.7	33.3	617	909	306	369
45 and over	17.4	21.7	36.4	31.1	6.1	9.3	18.8	16.7	230	323	165	261
	West[1]											
All ages	9.5	14.2	11.3	6.2	5.5	7.3	4.0	1.9	2,767	907	2,014	1,402
Under 5	.6	1.3	--------	--------	.3	1.3	--------	--------	324	78	284	133
5-9	1.6	6.9	1.9	--------	1.0	3.5	.6	--------	316	116	318	217
10-14	2.9	3.5	3.3	.9	2.9	2.6	2.8	.5	243	114	213	213
15-19	9.0	7.6	7.9	--------	6.2	4.2	2.6	--------	210	119	152	146
20-24	8.5	9.7	7.9	3.8	4.5	9.7	2.6	--------	176	63	114	78
25-44	17.2	23.7	21.3	12.8	11.3	14.1	10.2	6.2	932	291	610	374
45 and over	9.9	20.7	19.8	14.2	2.8	6.0	1.2	1.3	567	217	323	239

[1] For States included in the different sections, see footnote 1 to table 5.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

TABLE 9.—*History of typhoid fever cases among persons in metropolitan, urban, and rural parts of four geographic sections*[1] *of the United States—canvassed white families in 18 States*[2]

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
	Northeast[1]											
All ages	2.5	2.1	4.1	3.1	73	38	100	55	2,873	1,831	2,416	1,751
Under 10	.5	--------	.1	.2	4	--------	1	1	737	515	707	468
10–19	.8	.2	1.7	.6	5	1	7	2	597	406	417	318
20–34	3.0	3.3	3.5	4.9	16	11	17	16	542	330	484	329
35–44	3.6	3.0	6.9	4.9	20	7	24	11	551	233	349	223
45 and over	6.3	5.6	11.1	6.5	28	19	51	25	446	341	459	386
	North Central[1]											
All ages	2.7	4.4	3.8	3.8	173	166	70	77	6,538	3,795	1,863	2,002
Under 10	.2	.2	.3	------	4	2	2	------	1,840	1,259	600	558
10–19	1.0	2.3	1.9	.8	12	16	8	4	1,160	653	413	511
20–34	3.4	4.8	3.7	3.8	57	38	12	11	1,656	785	327	291
35–44	3.7	8.2	8.7	6.6	36	54	28	21	971	656	321	319
45 and over	7.7	13.6	9.9	12.7	70	56	20	41	911	412	202	323
	South[1]											
All ages	5.6	6.0	7.2	6.3	106	175	83	103	1,900	2,904	1,152	1,629
Under 10	.3	.9	.6	------	2	9	2	------	575	967	320	439
10–19	1.7	3.2	3.9	4.1	7	17	11	18	403	530	263	438
20–34	7.2	8.9	9.6	7.6	28	57	21	21	380	642	219	276
35–44	13.7	12.0	12.1	12.3	43	52	20	26	315	433	165	212
45 and over	11.3	12.4	17.6	14.4	26	40	29	38	230	323	165	264
	West[1]											
All ages	4.0	6.9	7.3	4.3	111	69	147	60	2,767	997	2,014	1,402
Under 10	.5	2.1	.7	------	3	4	4	------	640	194	602	352
10–19	1.3	2.1	2.5	.8	6	5	9	1	452	233	365	359
20–34	4.7	2.4	7.5	4.4	30	4	32	10	640	167	426	229
35–44	6.8	12.9	14.1	8.1	32	24	42	18	408	186	298	223
45 and over	7.1	14.7	18.6	13.0	40	32	60	31	567	217	323	239

[1] For States included in the different sections, see footnote 1 to table 5.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

As a test of the representativeness of the study year, the current rates may be cumulated [7] to approximate a curve of immunization histories that would result from the repetition year after year of the current typhoid immunization rates. Conversely, an approximation of the annual immunization rates per 100 for given years of age may be obtained from the cumulative curve by computing differences between the percentages immunized for successive ages. Considering both phases of this test, the cumulative history curve indicates that about 3.3 per-

[7] The method is valid only if all of the current immunizations are first immunizations, an assumption that seems approximately true up to 10 years of age.

cent [8] of children have been immunized against typhoid fever by the time they reach their fifth birthday, and the cumulation of the current rates up to 5 years of age (average rate is 0.22 per 100 children per year) gives 1.1 percent. To put it in another way, the cumulative figure of 3.3 percent by 5 years of age indicates an average annual rate under 5 years of 6.6 per 1,000, as against the observed rate of 2.2 per 1,000. For children under 5 years the immunizations during the study year amounted to only one-third of the annual average for preceding years. Carrying the procedure to 10 years of age, the history curve indicates that 7.3 percent were immunized by the tenth birthday, and the cumulation of the current rates gives 3.7 percent. If one deducts from the 7.3 percent who have been immunized by the tenth birthday the 3.3 percent immunized before the fifth birthday, there are 4.0 percent immunized between the fifth and tenth birthdays or an average annual rate of 8.0 per 1,000, as compared with an observed current rate at

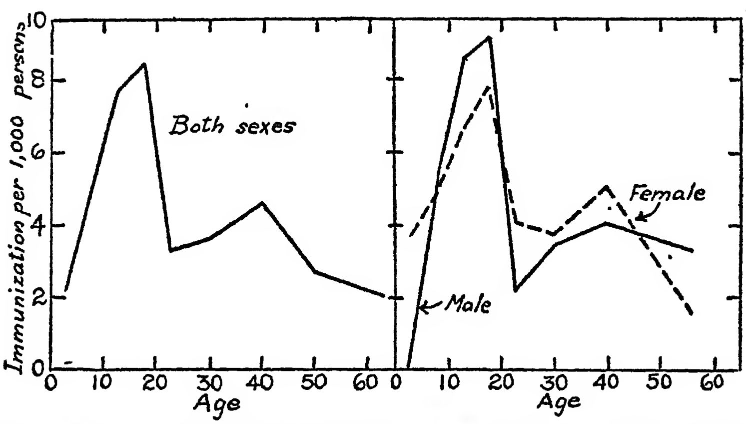

FIGURE 6.—Annual typhoid fever immunizations per 1,000 persons of specific ages for each sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31.

these ages of 5.1 per 1,000. Here, also, the annual average immunization rate in preceding years is considerably above the rate for the current year. Carrying the computations to the fifteenth birthday, the history curve indicates that 9.2 percent had been immunized, and the cumulation of the current rates is 7.5 percent. For the ages 10–14 years, the annual average immunization rate as estimated from the histories amounts to 3.8 per 1,000 as compared with an observed current rate of 7.7 per 1,000. Unlike the younger ages, the current immunization rate at ages 10–14 is higher than in the years immediately preceding the study.

In general, there is little agreement between typhoid immunization rates during the current year and the annual average immunization rate in preceding years. The disagreement may be due to one or more of the following reasons: (*a*) Incomplete reporting of either current or prior immunizations; (*b*) current immunizations may represent second or later immunizations for the same individual and therefore do not increase the percentage of persons with a history of immunization; (*c*) the current year may represent more immunizations than usual or less than usual; (*d*) the prior immunizations may represent more immunizations than usual or less than usual. A combination of these various possibilities is probably

[8] The figure 3.3 percent representing those who have been immunized by 5 years of age is a straight line interpolation between 2.6 at 4 years and 3.9 at 5 years of age at last birthday, which represent children of an average age of 4.5 and 5.5 years, respectively. A similar interpolation between the percentages for children 9 and 10 years of age was made to determine a figure for 10 years and an interpolation between the rates for 10-14 and 15-19 was made to determine a figure for 15 years of age.

the true reason for the disagreement; however, the last item mentioned appears to be the most important one, that is, the years immediately preceding the time of the survey have, at least in the South, all the earmarks of a period with far more immunizations than in normal years.

AGE, SEX, AND MARITAL STATUS

Figure 6 shows typhoid fever immunizations during the study year per 1,000 persons in specific age and sex groups (table 10). The maximum immunization rates occur at the ages between 10 and 20 years; this peak suggests more frequent immunizations through the schools, but it is probably influenced also by the fact that the younger ages (5–24 years) are the ones most frequently attacked by typhoid fever. There is a second but distinctly lower peak in immunizations at 35–44 years.

TABLE 10.—*Annual typhoid fever immunizations per 1,000 persons of specific ages of each sex—canvassed white familes in 18 States during 12 consecutive months, 1928–31*

Age in years	Both sexes [1]			Immunizations per 1,000 population per year		Number of immunizations		Population (years of life)	
	Immunizations per 1,000 population per year	Number of immunizations	Population (years of life)	Male	Female	Male	Female	Male	Female
All ages [1]	4.4	170	[1] 38,544	4.4	4.4	83	87	[1] 18,896	[1] 19,627
Under 5	2.2	12	5,513	.7	3.7	2	10	2,808	2,684
5–9	5.1	29	5,715	5.8	4.8	15	14	2,820	2,895
10–14	7.7	35	4,568	8.7	6.6	20	15	2,301	2,267
15–19	8.5	26	3,050	9.2	7.9	14	12	1,527	1,523
20–24	3.3	7	2,119	2.2	4.1	2	5	894	1,225
25–34	3.5	20	5,640	3.3	3.7	8	12	2,402	3,238
35–44	4.6	27	5,930	4.0	5.1	12	15	2,979	2,951
45–54	2.7	9	3,351	3.2	1.5	10	4	3,086	2,736
55 and over	2.0	5	2,471						

[1] "All ages" includes a few of unknown age; "both sexes" includes a few of unknown sex.

TABLE 11.—*Annual typhoid fever immunizations per 1,000 single and married persons 20–34 years of age, in canvassed white families in 18 States during 12 consecutive months, 1928–31*

Marital status	Immunizations per 1,000 population per year			Number of immunizations			Population (years of life)		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Single	4.4	2.2	6.7	8	2	6	1,812	922	890
Married	3.2	3.4	3.1	19	8	11	5,869	2,364	3,505

Considering the curves for each sex separately, immunizations were somewhat more frequent among males of the school ages, but the reverse is true for the ages from 20 to 45 years. Considering the

rather small number of immunizations, the two curves cannot be said to be significantly different.

Among persons 20–34 years of age, typhoid fever immunizations were more frequent among married than single males but less frequent among married than single females (table 11).

FAMILY INCOME

Considering persons of all ages, typhoid fever immunizations increased regularly from 2.2 per 1,000 in families with annual incomes of less than $1,200 to 7.9 among persons in families with incomes of $5,000 or more.[9] Figure 7 shows the rates for persons of specific

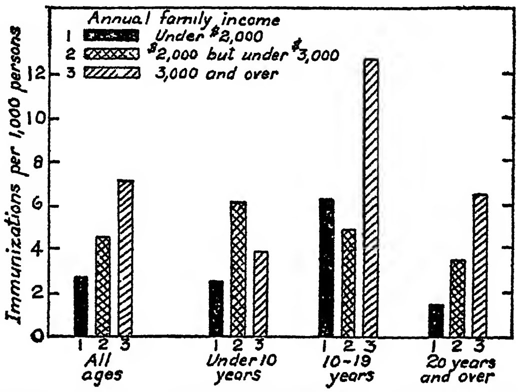

FIGURE 7.—Annual typhoid fever immunizations per 1,000 persons of specific ages in canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31.

ages classified into three family income groups. There are irregularities, but in general the higher income levels show more immunizations in each age group (table 12).

TABLE 12.—*Annual typhoid fever immunizations per 1,000 persons of specific ages in canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31*

Annual family income	Immunizations per 1,000 population per year				Number of immunizations				Population under observation [1]			
	All ages [2]	Under 10	10–19	20 and over	All ages [2]	Under 10	10–19	20 and over	All ages [2]	Under 10	10–19	20 and over
Under $2,000	2.8	2.5	6.2	1.4	53	16	24	13	19,239	6,292	3,842	9,042
$2,000 but under $3,000	4.5	6.1	4.9	3.5	43	17	9	17	9,491	2,779	1,846	4,876
$3,000 and over	7.1	3.9	12.7	6.5	68	8	24	36	9,600	2,059	1,806	5,5[illegible]2

[1] Nearly all persons were under observation the entire 12 months. For children born during the study an adjustment was made to reduce the observation period on them to full-time years of life.
[2] "All ages" includes a few of unknown age.

[9] Typhoid immunization rates per 1,000 for the three intervening classes were: $1,200–$2,000, 3.0; $2,000–$3,000, 4.5; $3,000–$5,000, 6.3.

OCCUPATION

Typhoid fever immunizations during the study year were more frequent among professional men than among clerks, salesmen, and merchants.[10] Both of these groups had considerably higher immunization rates than skilled and unskilled laborers (table 13).

TABLE 13.—*Annual typhoid fever immunizations per 1,000 persons in certain occupations—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Occupation	Immunizations per 1,000 population per year			Number of immunizations			Population		
	All ages, 15–64	15–44	45–64	All ages, 15–64	15–44	45–64	All ages, 15–64	15–44	45–64
	Males								
Professional men	12.1	9.4	17 0	8	4	4	662	427	235
Clerks, salesmen, merchants, and business men	5.8	5 6	6 0	16	11	5	2,780	1,948	832
Skilled and unskilled laborers	1.0	1 0	1.0	4	3	1	3,984	3,009	975
	Females								
Employed women	3.7	4 2	------	6	6	-----	1,629	1,433	196
Housewives [1]	3.7	4 1	2 2	29	25	4	7,897	6,041	1,856

[1] "Housewife" here means a person in charge of the home, and therefore includes a few single women.

VARIATION IN GEOGRAPHIC SECTIONS

It has been seen that, as measured by histories, typhoid fever immunization has been used far more in the South than in any other section of the country. In current immunizations, also, the South led all other sections (table 14). However, the rates for rural areas and small towns were about the same as those for the cities in the same geographic section.

VARIATION IN SPECIFIC LOCALITIES

Typhoid fever immunizations during the 12-month period of this study were largely concentrated not only in the South but in a few communities of the South. In table 15 the localities have been classified into those with large numbers of immunizations in the surveyed families, those with few or scattered immunizations only, and those with no typhoid immunizations during the 12 months. The table omits the few communities that were represented by less than 10 families; the great majority of the places included 30 or more households, the average being 73 families per community.

[10] The rate per 1,000 for merchants and business men (6 1) was about the same as for clerks and salesmen (" 5). Only 2 immunizations were done in the group of 938 farmers, a rate of 2.1 per 1,000. The rate for farm housewives was 3 0 and for town and city housewives 3.7 per 1,000.

TABLE 14.—*Annual typhoid fever immunizations per 1,000 persons in urban and rural parts of each geographic section—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Geographic section [1]	All ages [2]			Under 20 years			20 years and over		
	All localities	Cities of 5,000 and over	Towns under 5,000 and rural areas	All localities	Cities of 5,000 and over	Towns under 5,000 and rural areas	All localities	Cities of 5,000 and over	Towns under 5,000 and rural areas
	Immunization per 1,000 population per year								
All sections	4.41	4.49	4.28	5.41	5.83	4.76	3.49	3.30	3.82
Northeast	2.88	2.94	2.80	3.02	3.90	2.00	2.77	2.04	3.57
North Central	.97	.95	1.02	.42	.39	.47	1.53	1.48	1.68
South	13.95	14.04	13.80	18.22	19.23	16.51	9.33	8.53	10.75
West	2.99	3.88	2.01	3.66	4.49	2.90	2.51	3.56	1.15
	Number of immunizations								
All sections	170	108	62	102	67	35	68	41	27
Northeast	26	14	12	13	9	4	13	5	8
North Central	14	10	4	3	2	1	11	8	3
South	108	69	39	74	49	25	34	20	14
West	22	15	7	12	7	5	10	8	2
	Population (years of life)								
All sections	38,544	24,045	14,499	18,846	11,488	7,358	19,511	12,442	7,069
Northeast	9,043	4,762	4,281	4,309	2,305	2,004	4,692	2,448	2,244
North Central	14,413	10,502	3,911	7,194	5,077	2,117	7,188	5,402	1,786
South	7,741	4,914	2,827	4,062	2,548	1,514	3,646	2,344	1,302
West	7,347	3,867	3,480	3,281	1,558	1,723	3,985	2,248	1,737

[1] See footnote 1 to table 5 for States included in each geographic section.
[2] "All ages" includes a few of unknown age.

TABLE 15.—*Percentage of localities, of families and of typhoid immunizations in places with considerable numbers of immunizations, with few and with no immunizations in the surveyed group—canvassed white families in 119 localities with 10 or more families under observation during 12 consecutive months, 1928–31*

Typhoid fever immunizations in the surveyed families during the year of the study	Percentage of—			Number of—		
	Localities	Families	Immunizations	Localities	Families	Immunizations
All localities	100.0	100.0	100.0	119	8,713	165
Localities with a considerable number of immunizations (10 or more per 100 families)	6.7	4.7	63.6	8	411	105
Localities with few immunizations	16.8	34.8	36.4	20	3,029	60
Localities with no immunizations	76.5	60.5		91	5,273	

Eight communities, or 7 percent of the 119 localities, including 5 percent of the surveyed families, contributed 64 percent of the immunizations during the year. The other 36 percent of the immunizations were done in 20 communities (17 percent) which included 35 percent of the families. Seventy-six percent of the communities, including 60 percent of the families, reported no typhoid immunizations during the study year.

Although typhoid immunization is more frequently used in those areas where the typhoid problem is greatest, there is little indication in the available data that the procedure was extensively used in the face of epidemics, as is usual in the case of smallpox (7). Sharp and extensive outbreaks of typhoid fever, as waterborne epidemics usually are, now occur rather rarely, and the work of immunization is not stimulated by the presence of the disease in the way that it is in the more explosive smallpox epidemics. The longer period necessary to complete the three injections and acquire immunity also makes the procedure less applicable for use in the face of epidemics. However, the immunization of household contacts of typhoid fever is advocated by some health departments.

SEASONAL DISTRIBUTION

Typhoid fever immunizations are more frequent in the summer months than in the winter (fig. 8 and table 16). The peak of the

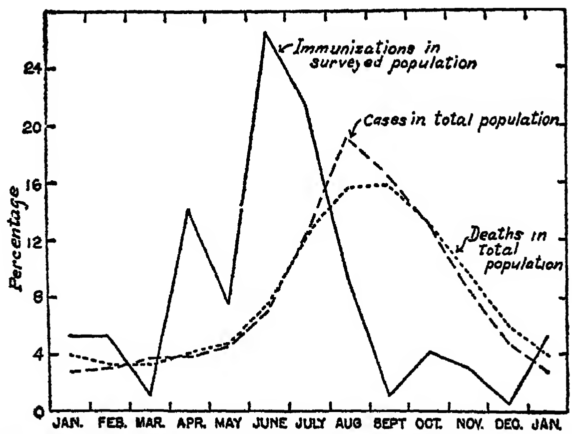

FIGURE 8.—Percentage of immunizations and of typhoid fever cases and deaths in each month (30-day basis)—immunizations in the surveyed families in 18 States, 1928–31; cases and deaths in the general population of 18 States, 1929–30.

immunizations in the group here considered came in June—about 2 months earlier than the peak [11] of the typhoid fever cases. It appears that typhoid immunizations are done in anticipation of the typhoid season or possibly of vacations and other summer activities that involve greater risk of contracting the disease.[12]

[11] The seasonal distribution of typhoid fever cases in the 28 localities having immunizations in the surveyed families is similar to that for the 18 States, with the peak in August. Harmon (19) has shown that the typhoid peak incidence comes earlier in the Southern States than in the Northern. According to his analysis, the highest incidence in the South comes in July, with August nearly as high; but June, the peak of the immunizations, is relatively low.

[12] No significant difference appears between the seasonal or the age distribution of immunizations in localities where there were many as compared with places with only few or scattered immunizations.

TABLE 16.—*Seasonal distribution of typhoid fever immunizations in the surveyed families and of typhoid fever cases and deaths in the general population*

	All months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Number	Percentage in each month (corrected to 30-day basis)											
Typhoid fever immunization in the surveyed population, 1928–31—All localities	170	5.3	5.8	1.2	14.2	7.7	26.6	21.3	9.5	1.2	4.1	3.0	0.6
Typhoid fever[1] in the total population of the 18 surveyed States—Based on calendar years 1929–30:													
Cases	22,448	2.8	3.0	3.7	3.9	4.6	7.2	12.6	19.0	16.6	13.1	8.6	4.8
Deaths	4,297	4.0	3.3	3.2	4.1	4.8	7.8	12.5	15.6	15.8	13.1	9.6	6.1
Typhoid fever[1] in the total population of continental United States—Based on calendar years 1929–30:													
Cases	50,490	2.5	2.7	3.4	3.6	4.7	8.2	13.8	18.3	16.4	12.8	8.8	4.7
Deaths	11,496	3.9	3.3	3.4	4.0	5.0	8.3	13.2	15.8	15.0	12.0	10.0	6.1
Based on medians for the 7 years 1922–28:													
Cases	34,417	4.0	3.8	2.9	3.2	4.3	7.4	13.1	17.6	17.5	13.4	7.9	5.3

[1] Cases from Notifiable Diseases in States (15) and deaths from Mortality Statistics (8), supplemented by State reports (15) for South Dakota in 1929 and Texas in 1929 and 1930.

TYPHOID IMMUNIZATIONS IN ATTACKED HOUSEHOLDS

Immunizations prior to the study.—Of the 71 persons in the 15 households which were attacked by typhoid fever during the 12-month study, 8 persons, or 11 percent, had been immunized prior to the study, as compared with 8 percent in the whole surveyed population. Of the 71 individuals in attacked households, 1 person, or 1.4 percent, had been previously attacked, as compared with 4.3 percent in the whole surveyed population.

Immunizations during the 12-month study.—Of the 56 persons in attacked households who were themselves not attacked, 16 persons, or 29 percent, were immunized during the year, presumably at the time that the case occurred and as a protection against it or its source of infection. This figure may be compared with only 0.44 percent of all individuals in the surveyed group who were immunized during the study year. Fifteen of the sixteen persons in attacked households who were immunized during the year were in the group of 45 unattacked persons who had never previously been immunized.

The 16 immunizations in the attacked households during the study year occurred in 4 of the 15 attacked families; the circumstances were as follows:

In a family of four persons, three of them were reported as having the first injection on May 16 and completing them on May 28, 1930. On June 5, 1930, one of the three, a 6-year old child, was reported as coming down with typhoid fever which involved 72 days in bed and 50 calls to the home by a physician. The head of the household was not immunized at this time but had been immunized in childhood.

In a family of seven persons, a 14-year old boy came down with typhoid on January 26 and died on February 21, 1929. On February 16 the other six members of the household received the first injection and completed the immun-

izations on March 3, 1929. These 6 immunizations were the only ones in the 97 surveyed families in that locality during the study year.

In a family of four persons, a case of typhoid had its onset on January 18, 1930, and the other three members started the injections on the same day and completed them on February 2. These 3 immunizations were the only ones in the 126 observed families in that community during the study year.

In a family of five persons, the mother, aged 31, came down with paratyphoid fever on July 7, 1929, and on the same day the other four members of the family started injections against typhoid, completing them on July 16. These 4 immunizations were the only ones during the year in the 100 families observed in that community.

A case in a household head, male, 26 years of age, was convalescent at the time the study began. The other two persons in the household had been immunized at the time of the onset of the case just prior to the year of the study.

TYPHOID FEVER CASES IN THE OBSERVED POPULATION

In the whole surveyed population there were 13 cases of typhoid fever with onset during the study year and 2 cases [13] with onset just prior to the year but sick during the year. The 13 new cases gives an annual rate of 33.7 per 100,000 persons, as compared with a reported average annual rate for the United States [14] of 20.6 for the years 1929–30, a period approximating that covered by the survey. Data on the completeness of reporting to health departments in North Carolina, Pennsylvania, California, and Illinois [15] in 1929 indicate that from 60 to 80 percent of the cases are reported. If these figures are applicable to the country as a whole, the rate for the surveyed population, although based on only 13 cases, is somewhere near the expectancy for the United States.

No data are available for the surveyed group on the time since receiving immunizing inoculations; in view of the rather short period of immunity following inoculation, it is not possible to make even a rough estimate of the effectiveness of the procedure in preventing typhoid in observed persons who had received the injections, because the procedure must be repeated at intervals of 2 or 3 years to be even partially effective.[16]

[13] The 15 cases of typhoid each occurred in a separate household. The 15 cases give an attack rate of 21 per 100 among the 71 persons in attacked households. Fourteen of the cases occurred among 59 individuals who had never been immunized or had a case—an attack rate of 24 per 100; 1 case occurred among the 8 individuals who had been immunized and none among the 4 persons who had had an attack prior to the study.

[14] In the 18 States included in the survey, the corresponding reported case rate was 16 8 per 100,000.

[15] A canvass of over 27,000 families including nearly 120,000 individuals in various counties of Illinois (11, p. 28) indicated that 62 percent of the 65 typhoid fever cases that occurred in the group during 1929 were reported to the health department. These and unpublished data from similar surveys in the other States mentioned form the basis for the estimate given above.

[16] The 14 cases among the 33,972 persons never immunized gives a case rate of 41.2 per 100,000; the one case among the 2,858 who had been immunized at some time in their lives gives a rate of 35.0 per 100,000, no cases occurred among the 1,621 persons who had suffered an attack of typhoid fever prior to the study. Computation of expected cases in the two latter groups from age-specific rates in the nonimmunized group shows no significant difference between actual and expected cases. However, no dependence can be placed on the results, because (a) the number of cases in nonimmunized persons and the number of immunized persons are both too small for the problem at hand and (b) many of the "immunized" persons represent individuals who received the injections only when in the military services more than 10 years prior to the study.

AGE AND SEX INCIDENCE OF TYPHOID FEVER AS REPORTED TO STATE HEALTH DEPARTMENTS

In the absence of sufficient data for the surveyed group, cases reported to health departments in Alabama, Mississippi, New York, Michigan, and California [17] are used to indicate in more detail the age curve of typhoid fever. Although typhoid fever rates vary greatly from city to rural areas (21, 22, 24), data based on reported cases in Michigan (12) indicate that the relative age curve is not greatly different in urban and rural places. Table 17 and figure 9 show the

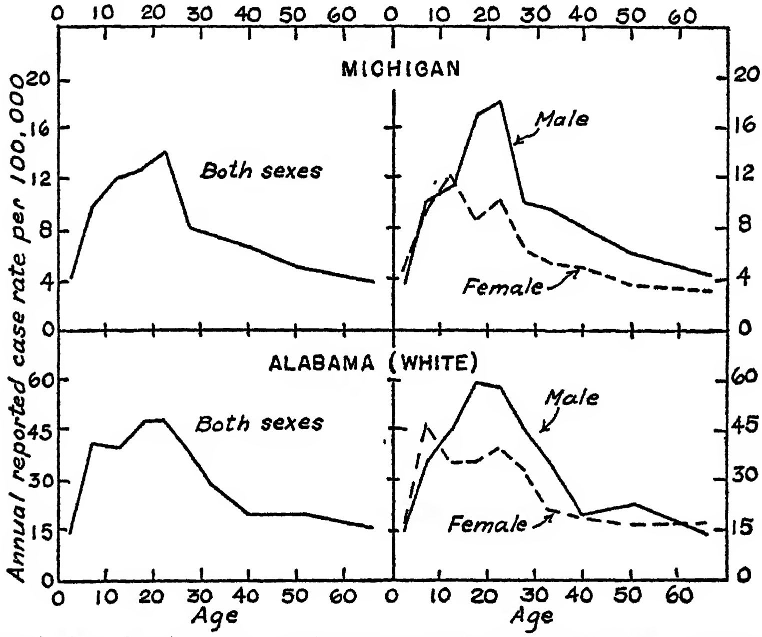

FIGURE 9.—Age and sex incidence of typhoid fever as reported to health departments in Michigan and Alabama, 1929–30. (Scales are so made that the rate for all ages of both sexes represents an interval on the vertical rate scale that corresponds to approximately 20 years on the horizontal age scale.)

rates for specific ages of each sex. Since the relative age curve is of more interest in this connection than the actual reported rates, the scales are arranged to make the curves comparable from that point of view.

In each State the highest incidence occurs in the school and young adult ages, with definite declines thereafter. Among females the peak incidence comes 5 to 10 years earlier than among males. Above 15 years the reported incidence is definitely higher for males than for females.

[17] These States are used as representing low and high typhoid death rates and various parts of the country. They are among the few which published reported cases of typhoid fever by age for the years 1929–30.

TABLE 17.—*Age incidence of typhoid fever*[1] *in 5 States*[2]—*Based on cases reported to State health departments, 1929–30*

	All ages[3]	Age: Under 5	5–9	10–14	15–19	20–24	25–29	30–34	35–44	45–54	55 and over
	Annual reported case rate per 100,000 population										
Alabama (white):											
Both sexes	32.2	14.8	40.9	40.4	47.6	48.1	39.2	28.8	19.7	19.9	15.8
Males	35.2	15.3	35.4	45.0	59.4	57.2	45.3	36.3	20.7	22 8	13.7
Females	29.1	14.3	46.6	35.6	35.8	39.5	33.4	21.6	18.7	16.7	17.4
Michigan (total):											
Both sexes	8 4	3.9	9 8	11.9	12.7	14.1	8.2	7.4	6.5	4.8	3.7
Males	9.6	3.4	10 1	11.3	17.0	18.0	9.9	9.4	7.9	6.0	4.3
Females	7.1	4.4	9.4	12.2	8.4	10.2	6.3	5.2	4 8	3.5	3.1
Mississippi (white):											
Both sexes	56.7	35.6	82.1	85.0	75.1	74.0	61.5	63.6	45.6	32.1	9.5
New York (total)[4]:											
Both sexes	12.6	7.3	19.6	20.1	19.7	16.9	14.5	11.5	11.2	9.1	4.8
California (total):											
Both sexes	13.0	9.9	21.8	21.7	17.1	22.0	13.0		7.5	6.5	3.3
	Number of reported cases for the 2 years										
Alabama (white):											
Both sexes	1,094	61	175	157	176	156	103	63	75	61	49
Males	603	32	77	89	110	90	58	39	39	37	22
Females	490	29	98	68	66	66	45	24	36	24	26
Michigan (total):											
Both sexes	814	36	95	107	106	118	68	58	95	48	42
Males	483	16	50	52	71	76	43	39	63	32	25
Females	331	20	45	55	35	42	25	19	32	16	17
Mississippi (white):											
Both sexes	1,130	83	200	189	161	140	93	82	105	58	19
New York (total)[4]:											
Both sexes	1,194	56	168	170	155	126	102	82	159	103	73
California (total):											
Both sexes	1,481	80	203	184	147	209	255		139	94	55

1 Including paratyphoid for all States except New York.
2 Data from annual reports of the respective State health departments.
3 "All ages" includes some of unknown age.
4 Exclusive of New York City, Buffalo, and Rochester.

TYPHOID FEVER MORTALITY AND CASE FATALITY AT SPECIFIC AGES

Since there was only 1 death among the 15 cases in the surveyed families, mortality data for the general population are used. In continental United States there were 50,490 cases (white and colored) of typhoid fever reported in 1929 and 1930, an annual incidence rate of 20.6 per 100,000. The total of 11,496 deaths registered[18] gives an annual mortality of 46.8 per million, and a case fatality of 22.8 percent, a figure that is no doubt much too high because of the incompleteness of case reporting. To express it in another way, there were 4.4 cases reported for each death registered. In a group of 78 cities with populations of 100,000 or over (15) where reporting is better but still incomplete, the average annual case rate for 1929–30 was 9.7 per 100,000, the death rate 16.2 per 1,000,000, with a case fatality of 16.7 percent, or 6 cases reported for each death registered. Wood

18 Mortality Statistics for the United States (8), supplemented by State reports (15) for South Dakota in 1929 and Texas in 1929 and 1930.

(27) found for Pennsylvania a case fatality of 10.6 percent by excluding deaths that had not been previously reported as cases. Leach and Maxcy (21) assumed 10 cases per death as representing complete reporting of typhoid fever, that is, a case fatality of 10 percent.

TABLE 18.—*Annual typhoid fever mortality and morbidity in the general population of 4 geographic sections of the United States, 1929–30, as reported to the health departments of all States and of the States sampled in the survey*

Geographic section [1]	Annual death rate per 100,000		Annual reported case rate per 100,000		Number of deaths in the 2 years		Number of cases reported in the 2 years		Number of States [3]	
	Surveyed States	All States	Surveyed States	All States	Surveyed States	All States	Surveyed States	All States	Surveyed States	All States
All sections	3.22	4.68	16.85	20.56	4,297	11,496	22,448	50,490	[3] 18	[3] 49
Northeast [1]	1.18	1.57	8.71	10.63	435	1,083	3,214	7,316	3	9
North Central [1]	2.14	[2] 2.50	11.83	12.12	1,271	[2] 1,931	7,036	9,359	7	[2] 12
South [1]	10.86	[4] 10.17	48.52	38.66	2,208	[4] 7,703	9,862	29,268	[3] 5	[3] [4] 17
White	8.74	8.01	([5])	([5])	1,348	3,747	([5])	([5])	5	16
Colored	17.56	16.70	([5])	([5])	860	2,886	([5])	([5])	5	16
West [1]	2.31	3.27	14.11	19.11	383	779	2,336	4,547	3	11

[1] The 4 sections in terms of the 9 U. S. Census geographic areas and their typhoid death rates in 1929–30 were as follows:
Northeast: New England (1.23) and Middle Atlantic (1.68).
North Central: East North Central (2.20) and West North Central (3.08).
South: South Atlantic (8 90), East South Central (11.30), and West South Central (10.91).
West: Mountain (6 42) and Pacific (1.85).
[2] South Dakota was not in the registration area in 1929; deaths were obtained from State reports (15).
[3] The District of Columbia is counted as a State.
[4] Texas deaths from State reports (15) are included in the total but are not available by color.
[5] Cases not available by color.

Typhoid mortality varies greatly in the different sections of the country. Data are available by individual States (8) and even by counties, but the summary for broad geographic sections in table 18

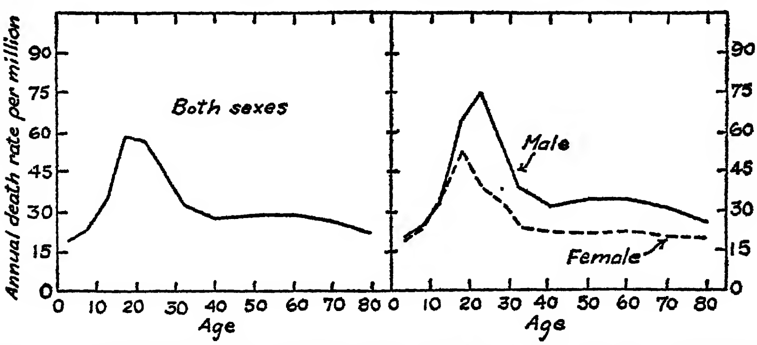

FIGURE 10.—Typhoid fever mortality at specific ages for each sex—white population in the registration States, 1929–30. (Scale is so made that the rate for all ages of both sexes respresents an interval on the vertical rate scale that corresponds to approximately 20 years on the horizontal age scale.)

will indicate roughly the regions where the typhoid problem is greatest. The death rates in the white population of the South are definitely higher than in the North, with a still higher mortality among the colored.

Table 19 and figure 10 show by age and sex the mortality from typhoid fever in the white population of the total registration States. The mortality curve is similar to that of case incidence, with the highest rates between 15 and 25 years of age; the peak for females is at 15–19, and for males at 20–24 years. Below 15 years there is little difference between the sexes, but at the various ages above 15 the mortality of males is roughly 50 percent above that of females.

TABLE 19.—*Annual typhoid fever mortality, at specific ages for each sex—white persons, in the registration States,*[1] *1929–30*

	Age												
	All ages [2]	Under 5	5–9	10–14	15–19	20–24	25–29	30–34	35–44	45–54	55–64	65–74	75 and over
Annual death rate per million:													
Both sexes	34.3	19.4	23.7	34.5	58.9	56.8	45.0	32.1	27.4	28.6	28.6	25.6	21.9
Male	39.6	19.9	24.5	33.3	64.2	74.2	55.9	39.0	32.1	34.9	34.5	31.2	25.1
Female	28.8	18.8	22.9	35.7	53.5	39.9	34.4	25.1	22.3	21.8	22.3	19.9	19.0
Number of deaths (2 years):													
Both sexes	7,145	367	496	695	1,135	1,024	737	498	809	646	429	220	75
Male	4,177	192	260	340	620	659	453	303	458	410	267	136	41
Female	2,968	175	236	355	515	365	284	195	321	236	162	84	34

[1] Registration States included all except Texas and South Dakota in 1929 and all except Texas in 1930.
[2] "All ages" includes a few of unknown age.

Table 20 shows mortality rates for persons of specific ages in the five States for which case incidence figures were shown in table 17. The rates are much higher in the two Southern States; but, considering the small numbers of deaths for some of the ages, the relative

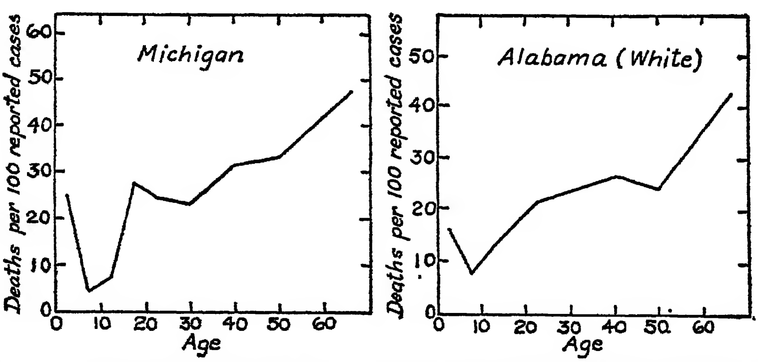

FIGURE 11.—Variation with age in the case fatality of typhoid fever—deaths per 100 reported cases in Michigan and Alabama, 1929–30. (Scales are so made that the rate for all ages represents an interval on the vertical rate scale that corresponds to approximately 20 years on the horizontal age scale.)

variation with age is reasonably similar in each State. The peak of the mortality comes in the late school and young adult ages, except in the New York State data, where it is somewhat later.

Table 20 also shows case fatality in terms of deaths per 100 reported cases. Since not all cases are reported, the actual fatality rates are

too high, but the age curves shown in figure 11 are of interest. The lowest case fatality occurs from 5 to 15 years, with a rise thereafter. The Michigan data indicate a small peak at 15–19 years, which is not present in the Alabama curve; however, the numbers of deaths are small, and so the apparent differences between the curves may be due to chance.

TABLE 20.—*Variation with age and sex in the case fatality of typhoid fever [1] in five States [2]—based on cases reported to health departments and total deaths registered, 1929–30*

	All ages [3]			Both sexes									
	Both sexes	Male	Female	Under 5	5–9	10–14	15–19	20–24	25–34	35–44	45–54	55 and over
	Deaths per 100 reported cases												
Alabama (white)	18.6	19.1	18.2	16.4	8.0	12.7	17.6	21.8	23.5	26.7	24.6	42.9
Michigan (total)	21.4	21.1	21.7	25.0	4.2	7.5	27.4	24.6	23.0	31.6	33.3	47.6
Mississippi (white)	10.1	([5])	([5])	9.6	2.0	3.2	14.3	12.1	14.8	16.2	12.1	31.6
New York (total) [4]	12.4	([5])	([5])	4.0		10.0	7.1	12.7	12.0	22.0	20.4	23.3
California (total)	13.2	([5])	([5])	11.2	5.4	10.9	11.6	15.3	18.4	20.1	21.3	21.8
	Annual death rate per million population												
Alabama (white)	60.0	67.1	52.8	24.3	32.7	51.4	83.8	104.8	81.0	52.5	49.0	67.9
Michigan (total)	18.0	20.2	15.5	9.7	4.1	8.8	34.8	34.7	17.9	20.5	16.1	17.8
Mississippi (white)	57.2	64.4	49.8	34.4	16.4	27.0	107.3	89.8	92.8	73.9	38.7	30.1
New York (total) [4]	15.6	18.8	11.9	5.5		20.1	14.0	21.4	15.5	24.6	18.5	11.2
California (total)	17.3	22.9	11.2	11.1	11.8	23.6	19.8	33.7	24.0	15.0	13.8	7.2
	Number of deaths for the 2 years												
Alabama (white)	204	115	89	10	14	20	31	34	39	20	15	21
Michigan (total)	174	102	72	9	4	8	29	29	29	30	16	20
Mississippi (white)	114	65	49	8	4	6	23	17	26	17	7	6
New York (total) [4]	148	90	56	1	8	17	11	16	22	35	21	17
California (total)	196	135	61	9	11	20	17	32	47	28	20	12

[1] Including paratyphoid for all States except New York.
[2] Cases from the annual reports of the respective State health departments (see table 17); deaths from Mortality Statistics for the United States (8) for all States except New York.
[3] "All ages" includes some of unknown age.
[4] Exclusive of New York City, Buffalo, and Rochester.
[5] Cases not available by sex.

REACTIONS FOLLOWING IMMUNIZATION

Of the 170 immunizations against typhoid fever, only 2, or 1.2 percent, were reported as being accompanied by reactions of sufficient severity to cause loss of time from school, work, or other usual activities. In one of these immunizations, in a male 14 years of age, 2 days of illness were reported, with one of the days in bed; the other, male 49 years, reported one-half day lost from work, but was not in bed, and the report may have referred to time lost in going to the doctor for immunization rather than real disability. The figure of 1.2 percent of the 170 typhoid fever immunizations with reactions that caused disability may be compared with 6.0 percent for the

1,209 smallpox vaccinations, 1.2 for the 487 diphtheria immunizations, and 14.3 for the 28 scarlet fever [19] immunizations.

WHERE IMMUNIZATIONS WERE DONE

Of all typhoid fever immunizations during the study year, 52 percent were done in public clinics or by school physicians. This figure may be compared with 57 percent for diphtheria immunizations, 42 percent for smallpox vaccinations, 36 percent for scarlet fever immunizations, and 3 percent of cases given cold vaccine. Of all typhoid fever immunizations done in public clinics, 98 percent were free.

The percentage of typhoid fever immunizations that were done in public clinics decreases from 67 for persons under 5 years to 62 at 5–9, 51 at 10–14, and 38 at 15–19 years. Among adults 20–44 years of age the figure rises again to 52 percent, and in persons over 45 years 43 percent of the immunizations were done in public clinics. Of all typhoid immunizations, 4.1 percent were done by specialists and 2.4 percent had a visiting nurse on the case, presumably to urge immunization.

IV. SUMMARY

Information on the history of typhoid fever immunizations and cases at any time and more detailed records of typhoid immunizations during a 12-month period between 1928 and 1931 were obtained on 8,758 white families in 130 localities in 18 States. Each family was visited at intervals of 2 to 4 months to secure the data.

The surveyed families include representation from nearly all geographic sections, from rural, urban, and metropolitan areas, from all income classes, and of both native- and foreign-born persons. The proportions of these various elements included are not identical with those in the population of the United States, but the variations are not generally large. In other respects, also, the surveyed group is not dissimilar to families in the general white population of the United States.

Considering the whole group, about 10 percent of persons 15–19 years of age gave a history of a typhoid immunization, and 2 percent gave a history of an attack. At 35–44 years, 12 percent gave a history of an immunization and 8 percent history of an attack (fig. 1).

Above 15 years of age, histories of typhoid immunizations were more frequent in males than females; the large differences between the sexes for the ages 30 to 45 are presumably the result of immunization in the military and naval services during the World War (fig. 2).

Persons living in rural areas showed the highest and those living in large cities the lowest percentages with a history of typhoid immunization. The large cities show the lowest typhoid fever history rates,

[19] These figures represent the results of injections made largely in 1929 and 1930 prior to the development of scarlet fever toxoid, which causes less reaction.

but the small towns and small cities have rates that are slightly above the rural areas. In general, typhoid immunization seems to have been resorted to most frequently where the typhoid problem is greatest (fig. 3).

The South, with the highest percentage of persons with a history of typhoid fever, has resorted to immunization far more than any other section (fig. 4). The West, with the next highest typhoid history rate, has not resorted to immunization any more than other geographic sections.

In cities over 100,000, immunizations are not much more frequent in the South than elsewhere; the excess for the South is particularly large for small towns and rural areas (fig. 5).

Typhoid fever immunizations during the 12 months of the morbidity study amounted to 4.4 per 1,000 population of all ages. There was no consistent difference between the sexes in the frequency of immunizations (fig. 6).

The frequency of typhoid immunizations increased regularly with family income (fig. 7).

Immunizations during the study year were also more frequent in the South than in other geographic sections. About 64 percent of the typhoid immunizations during the study year were done in 7 percent of the localities.

The seasonal peak of immunizations came about two months before that of typhoid cases and deaths (fig. 8). Immunizations in this group seem to have been done in anticipation of the typhoid season rather than in the face of epidemics.

Reported typhoid cases and deaths both show maximum rates between 15 and 25 years of age. The peaks come at an earlier age among females than among males. In the adult ages both incidence and mortality are definitely higher among males than among females (figs. 9 and 10).

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POST-MORTEM FINDINGS IN FATALITIES DUE TO THE USE OF THE ARSPHENAMINE GROUP

A Review of 44 Autopsies

By S. S. Cook, *Commander, Medical Corps, United States Navy*

The discovery of "606" by Ehrlich in 1910 ushered in a new era in the treatment of syphilis. Along with this new and superior therapeutic agent came new ideas and hopes for the cure of this disease. Also new problems were introduced in pharmacology and toxicology. Today, more than 25 years later, much remains to be learned of the toxicology of the arsphenamines. The clinical signs of toxicity are fairly well understood, but no one can predict which patients will experience untoward symptoms nor is there agreement as to the exact mechanism of the toxic action of the organic arsenicals.

So far as can be determined by a reasonably careful search of the Navy records, there were 63 deaths chargeable to the arsphenamines during the 17-year period 1919–35. There were 44 autopsies.

In the belief that a better understanding of the action of these drugs may be gained by a study of the lesions found at autopsy, this article is devoted to a review of the post-mortem findings in the 44 autopsies. The age, duration of infection, interval between the final injection and onset of symptoms, previous treatment, duration of illness, year of death, and post-mortem findings are shown in table 1.

Age, sex, and race.—The youngest man was 19 years of age, the oldest was 43, and 29 of the 44 were under 30. All of them were males. Cases 3, 36, and 37 were Filipinos, case 40 was a Hawaiian, case 19 was a Negro, and the remaining 39 were white.

Duration of infection.—All of the patients had syphilis, the duration of which was unknown in six instances. Of the remaining 38, in 21 it was less than 6 months; in 1, between 6 months and 1 year; in 4, between 1 and 3 years; in 2, between 3 and 5 years; and in 10, over 5 years.

Interval between final injection and onset of symptoms.—In 6 instances the interval could not be accurately determined, because symptoms developed gradually and did not attract attention until well advanced. In the remaining 38, symptoms appeared in 7 instances in 5 minutes or less; in 11, in less than 6 hours; in 11, between 6 hours and 48 hours; and in the remaining 9 the interval varied from 3 days to 29 days.

Previous treatment.—The type of arsenical given at the final injection was in 34 instances neoarsphenamine; in 5, salvarsan; in 2, arsenobenzol; in 2, arsphenamine; and in 1 the type was not stated. This is not to be interpreted as an indication of the greater toxicity of neoarsphenamine; this arsenical is the one most extensively used in the Navy.

The number of injections that the patients had received, including the final one, were as follows:

Number of injections	Number of men	Number of injections	Number of men
2	12	10 and over	13
3	7	Unknown	1
4	2		
5	2	Total	44
6–9	7		

It is noted that there were no deaths following the first injection.

Post-mortem findings.—The striking features are the frequency of edema, congestion, and hemorrhages in the different organs. This is not surprising when one recalls that one of the effects of arsenic is to cause dilatation of the capillaries with increased permeability. An additional effect is attributed to the drug by many authorities, namely, damage to the endothelial lining of the capillaries. If this action extends to the reticulo-endothelial system, one has a basis for nearly all the manifestations of arsenic poisoning. It is obvious that these factors will produce marked variations in symptomatology and pathology, depending on the location and amount of edema and hemorrhage.

One of the most common and least serious reactions which follows the administration of the arsphenamines is the so-called nitritoid phenomenon. This has been attributed by Kolmer and others to a vasodilatation or vasoparesis. One of the reasons for this belief is the prompt relief which usually follows the injection of a vasoconstrictor such as adrenalin.

Probably the most severe reactions are those usually diagnosed as hemorrhagic encephalitis. In these there is the factor of edema, which causes increased intracranial pressure and the symptoms familiar to all, and the other factor of hemorrhage into vital centers. The characteristic pathologic picture is a wet brain with multiple punctate hemorrhages.

In this series of 44 autopsies, involvement of the brain was found in 21 instances; in 2 instances the findings were negative, and in the remaining 21 cases the brain was not examined. Judging from the clinical picture it is altogether probable that a number of the latter had involvement of the brain.

Hemorrhages in the liver were noted in 4 instances, edema in 3 instances, and in 18 additional cases there was some other type of liver involvement such as degeneration, necrosis, or congestion.

Hemorrhages in the kidneys were noted 9 times, and other lesions such as cloudy swelling, congestion, edema, and degeneration were noted 24 times.

Hemorrhages in the lung were noted 3 times and edema 12 times. In five instances there was hemorrhage into the myocardium or pericardium.

The spleen was found to be hemorrhagic in five instances.

There were hemorrhages into the pancreas in two cases.

Petechial hemorrhages were found in the stomach and small intestines on seven occasions.

It is noted that in many cases several organs showed hemorrhages or edema or both.

In case 4 there were edema and hemorrhages in the brain and also congestion of the lungs, heart, and spleen.

In case 16 there were hemorrhages in the brain, liver, kidneys, and spleen. This man, who had had syphilis for one month, died 4 days after his third injection of neoarsphenamine.

Case 21, a patient who had acquired syphilis 4 months previously, died 3 days after his second injection of neoarsphenamine and was found to have edema of the brain, liver, kidneys, and lungs and petechial hemorrhages in the walls of the small intestine.

Case 36, with syphilis of 4 months' duration, collapsed immediately after his eighth injection and died in 45 minutes. He had hemorrhages in all the tissues of the body, including the pancreas.

Case 41 had a convulsion 3 minutes after his fifth injection of neoarsphenamine and died in 6 hours. At autopsy there were found edema of the brain and lungs, congestion of the spleen and kidneys, and petechial hemorrhages of the small intestine.

The pathological findings which have been presented are suggestive of a common basis for the diverse clinical signs of arsphenamine poisoning. If capillary damage is the fundamental structural alteration, the concept of this problem is narrowed and greatly simplified.

SUMMARY

In the 17-year period 1919–35 there were 63 deaths in the United States Navy following the administration of the arsphenamines. All of the 44 autopsies were made on males, none of whom was over 43 years of age. In this group were 3 Filipinos, 1 Hawaiian, 1 Negro, and 39 whites.

All of the patients had syphilis. The duration of infection is known in 38 instances. In 21, or 55 percent, it was less than 6 months, and in 17, or 45 percent, over 6 months. The time interval between the final injection and onset of symptoms was less than 6 hours in 18 cases, over 6 hours in 20 cases, and unknown in 6 cases.

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Neoarsphenamine caused the largest number (34) of the deaths, which was to be expected, as this is the arsenical most extensively used in the Navy.

None of the patients died after the first injection of an arsenical; 12 died after the second; 23 after 5 injections or less; and 20 had received more than 6 injections. In one instance the number is not known.

TABLE 1.—*Deaths following administration of the arsphenamines,*

Marginal no.	Age (years)	Duration of infection	Interval between treatment and onset	Previous treatment	Duration of illness	Year of death	Post-mortem findings: Brain
1	20	1 month	24 hours	Feb. 17, 1919, 0.6 g salvarsan; Feb. 27, 1919, 0.5 g salvarsan.	24 hours	1919	
2	26	do	Immediate	May 20, 1919, 0.6 g salvarsan; May 27, 1919, 0.6 g salvarsan; June 3, 1919, 0.6 g salvarsan.	3 days	1919	
3	22	2 years	24 hours	Sept. 8, 1919, 0.6 g arsenobenzol; Sept. 16, 1919, 0.6 g arsenobenzol.	24 hours	1919	
4	20	Unknown	2 hours	Aug. 25, 1920, 0.6 g salvarsan; Sept. 1, 1920, 0.6 g salvarsan.	72 hours	1920	Edema and hemorrhages.
5	25	3 years	Immediate	Unknown amount in 1917; Oct. 26, 1920, 0.6 g neoarsphenamine; Oct. 31, 1920, 0.6 g neoarsphenamine.	4 days	1920	
6	19	20 days	48 hours	July 13, 1921, 0.6 g neoarsphenamine; July 20, 1921, 0.8 g neoarsphenamine.	48 hours	1921	Congestion.
7	20	2 months	3 days	Dec. 22, 1920, to Feb. 1, 1921, 6 injections arsphenamine, 1 of 0.3 g and 5 of 0.6 g.	1 day	1921	No pathology.
8	22	5 months	Few hours	May 17, 1921, 0.3 g arsphenamine; May 24, 1921, 0.4 g arsphenamine.	14 days	1921	
9	21	1 month	Immediate	Feb. 8, 1921, 0.6 g neoarsphenamine; Feb. 23, 1921, 0.6 g neoarsphenamine; Mar. 2, 1921, 0.9 g arsenobenzol.	1½ hours	1921	
10	28	Unknown	do	Feb. 23, 1922, 0.9 g salvarsan; Mar. 2, 1922, 0.9 g salvarsan.	96 hours	1922	
11	36	1 month	48 hours	Aug. 9, 1923, 0.45 g neosalvarsan; Aug. 16, 1923, 0.9 g neosalvarsan.	24 hours	1923	
12	24	19 days	3 days	Nov. 12, 1924, 0.4 g salvarsan; Nov. 19, 1924, 0.6 g neosalvarsan.	48 hours	1924	Edema with injection.
13	23	1 month	Unknown	May 28, 1924, to June 5, 1924, 3 injections neoarsphenamine.	Unknown	1924	Congestion.
14	29	8½ years	5 hours	May 13, 1921, to Nov. 30, 1921, 7 injections arsenicals; Oct. 7, 1924, 0.45 g neoarsphenamine; Oct. 14, 1924, 0.9 g neoarsphenamine; Oct. 21, 1924, 0.9 g neoarsphenamine.	6 hours	1924	Edema
15	29	Unknown	24 hours	Apr. 1, 1926, to May 3, 1926, 5 injections neoarsphenamine, the last of 0.75 g.	24 hours	1926	Weight, 1,425 g; injection of vessels.
16	27	1 month	48 hours	Oct. 1926, 3 injections neoarsphenamine, 0.45, 0.6, and 0.9 g.	48 hours	1926	Hemorrhagic encephalitis; weight, 1,500 g.
17	21	18 days	6 hours	Apr. 20, 1926, 0.45 g neosalvarsan; Apr. 27, 1926, 0.6 g neosalvarsan.	4 days	1926	Edema; injection of capillaries.
18	22	15 days	12 hours	Feb. 5, 1926, 0.45 g. neosalvarsan; Feb. 9, 1926, 0.65 g neosalvarsan; Feb. 16, 1926, 0.9 g neosalvarsan.	72 hours	1926	Edema.

Autopsies were performed on 44 cases, the results of which are presented and discussed.

The striking findings were frequent hemorrhages and edema in the various organs of the body.

The autopsy findings are suggestive of a common pathologic basis for many of the clinical manifestations.

United States Navy, 1919–35—Post-mortem findings in 44 cases

Post-mortem findings					
Liver	Kidneys	Lungs	Heart	Spleen	Remarks
----------	Left—enlarged; soft.	----------	Fibrosis.	----------	
Enlarged and engorged with blood.	Swollen with hemorrhagic areas.	----------	----------	Enlarged and engorged.	
----------	----------	----------	Emboli in right auricle and right ventricle.	----------	Embolus in cephalic vein above needle puncture.
----------	Enlarged.	Congestion.	Congestion.	Weight, 312 g; congestion.	
Dark and soft.	Enlarged with punctate hemorrhages.	----------	----------	Greatly enlarged.	
Mottled.	----------	----------	Dilated right auricle.	Mottled.	Enlarged abdominal lymph glands.
Necrosis.	Necrosis.	----------	----------	Necrosis.	Left adrenal enlarged and congested.
Hemorrhages.	Hemorrhages.	Bloody fluid in pleural cavity.	----------	Hemorrhages.	Hemorrhage in pancreas and intestinal mucosa.
----------	----------	Lower left adherent.	----------	----------	Unneutralized arsenobenzol; thymus gland 5 cm x 1 cm x 1½ cm.
Hemorrhages.	Pus in pelves.	Edema.	----------	Hemorrhages.	
----------	Congestion.	----------	----------	----------	General glandular enlargement.
----------	----------	Congestion.	----------	----------	Positive blood cultures for staphylococcus aureus.
Acute congestive nephritis.	----------	----------	----------	Marked enlargement.	
Congestion.	Acute tubular nephritis.	Edema.	----------	Infarct.	
Passive congestion.	Mottling; blue in color.	Right lower lobe consolidated.	Weight 390 g; enlarged.	----------	
Weight 1,700 g; hemorrhages.	Weight 200 g.	----------	----------	Weight 300 g; hemorrhages.	
----------	----------	----------	----------	----------	
----------	Edema.	Edema.	----------	----------	

TABLE 1.—*Deaths following administration of the arsphenamines, United*

Marginal no.	Age (years)	Duration of infection	Interval between treatment and onset	Previous treatment	Duration of illness	Year of death	Post-mortem findings: Brain
19	36	11 years	Few hours	July 15, 1926, 1 injection neoarsphenamine; July 22, 1926, 0.45 g neoarsphenamine.	13 days	1926	
20	40	Unknown	12 hours	Mar. 23, 1927, 0.3 g salvarsan; Mar. 30, 1927, 0.6 g salvarsan.	36 hours	1927	Intense congestion of meninges with exudate.
21	26	4 months	48 hours	Nov. 29, 1927, 0.45 g neosalvarsan; Dec. 8, 1927, 0.6 g neosalvarsan.	12 hours	1927	Wet brain; blood in internal capsule.
22	42	20 years	Unknown	Feb. 24, 1927, to Aug. 4, 1927, 16 injections neoarsphenamine.	Unknown	1927	
23	29	1 month	2 hours	Nov. 7, 1927, 0.45 g salvarsan; Nov. 10, 1927, 0 3 g salvarsan; Nov. 14, 1927, 0.45 g salvarsan.	31 hours	1927	Negative.
24	24	4 months	Unknown	July 11, 1927, to Aug. 25, 1927, 4 injections neoarsphenamine.	Unknown	1927	Engorgement of surface vessels.
25	28	5 years	4 days	1923 to 1926, 24 injections arsenicals; June 12, 1928, to Aug. 2, 1928, 8 injections neoarsphenamine.	48 hours	1928	Hemorrhages with focal necrosis.
26	38	Unknown	8 minutes	Sept. 29, 1928, to Nov. 10, 1928, 6 injections neoarsphenamine, the first of 0.25 and the others of 0.9 g.	45 minutes	1928	Edema
27	40	19 years	15 days	May 8, 1928, to Sept. 15, 1928, 10 injections arsenicals, amounts and types not stated.	Unknown	1928	Abdominal incision only.
28	27	3 months	6 days	June 30, 1928, to Aug. 18, 1928, 8 injections of neoarsphenamine.	1 month	1928	
29	24	10 months	Unknown	1928, 12 injections neoarsphenamine, 0.45 g each; Feb. 6, 1929, to July 22, 1929, 14 injections neoarsphenamine.	Unknown	1929	
30	21	1 year	do	1928, 5 injections neoarsphenamine, 0.6 g each; July 1, 1929, to Aug. 12, 1929, 4 injections neoarsphenamine.	do	1929	
31	41	17 years	do	1912, 1 injection salvarsan; 1915, 8 injections neosalvarsan; 1924, 13 injections neosalvarsan; 1927, 4 injections salvarsan; Apr. 13, 1929, to May 11, 1929, 5 injections neosalvarsan.	do	1929	Cerebrum soft from previous hemorrhages.
32	30	3 years	24 hours	1927 and 1928, 27 injections neoarsphenamine; 1929, injections, number not given; Aug. 8, 1930, 0.3 g neoarsphenamine; Aug. 14, 1930, 0.6 g neoarsphenamine; Aug. 20, 1930, 0.4 g neoarsphenamine.	20 days	1930	Congestion of meningeal vessels.
33	22	3 months	48 hours	Nov. 7, 1929, to Dec. 27, 1929, 8 injections neoarsphenamine, total 5.4 g; Feb. 6, 1930, to Feb. 27, 1930, 4 injections neoarsphenamine, total 2.1 g.	14 days	1930	
34	31	11 years	1¼ hours	1921–32, inclusive, 65 injections, the last of 0.2 g neoarsphenamine.	7 hours	1932	Edema and hemorrhages.

States Navy, 1919–35—Post-morten findings in 44 cases—Continued

Post-mortem findings					
Liver	Kidneys	Lungs	Heart	Spleen	Remarks
Markedly enlarged and friable.			Intense congestion of myocardium and pericardium.		
Edema	Edema	Edema			Few petechial hemorrhages, small intestines.
					Emphysema due to gas bacillus infection; exfoliative dermatitis.
Pale	Pale	Congestion			Many petechial hemorrhages, stomach and small intestines.
	Weight 175 g each; petechial hemorrhages.		Weight 275 g.		Petechial hemorrhages, skin and mesentery.
	Congestion		Hemorrhages in pericardium.		
	Normal	Edema	Flabby muscle.		
				Enlarged	Bright red abdominal muscles.
	Marked enlargement.	Innumerable small abscesses.			100 cc bloody fluid in right pleural cavity; exfoliative dermatitis.
		Hemorrhagic bronchopneumonia.			Aplastic anemia.
Small, nodular destruction of cells.	Slightly enlarged. Destruction of tubular epithelium.				Ecchymotic patches, serosa, small intestine.
Cirrhosis	Nephrosis				Profound secondary anemia.
Cloudy swelling.	Cloudy swelling.		Sclerosis of aorta.		Fat necrosis in abdomen; acute pancreatitis with abscess formation.
	Hemorrhages	Edema	Hemorrhages		Hemorrhages in bladder, intestines, pleurae, pericardium, hypoplastic bone marrow.
Acute degeneration.	Acute degeneration.	do			Hypoplastic bone marrow, intense hyperemia of all viscerae.

TABLE 1.—*Deaths following administration of the arsphenamines, United*

Marginal no.	Age (years)	Duration of infection	Interval between treatment and onset	Previous treatment	Duration of illness	Year of death	Post-mortem findings: Brain
35	30	10 years	6 hours	1922–30, inclusive, 60 injections arsenicals; Mar. 14, 1932, to Nov. 1, 1932, 19 injections neoarsphenamine, the last of 0.5 g.	4 days	1932	Edema and hemorrhages.
36	35	4 months	5 minutes	Nov. 23, 1932, to Jan. 10, 1933, 6 injections neoarsphenamine; Mar. 4, 1933, 0.3 g neoarsphenamine, Mar. 11, 1933, 0.45 g neoarsphenamine.	45 minutes	1933	Hemorrhages
37	32	12 years	1 hour	1921, 8 injections neoarsphenamine; 1922, 8 injections neoarsphenamine; 1925, 6 injections neoarsphenamine; July 11, 1933, 0.3 g neoarsphenamine; July 18, 1933, 0.6 g neoarsphenamine	9 days	1933	
38	29	6 years	do	1927–32, inclusive, 41 injections neoarsphenamine; Nov. 25, 1933, to Dec. 9, 1933, 4 injections neoarsphenamine, the last of 0.6 g.	12 days	1933	
39	43	14 years	do	Feb. 14, 1933, 0.3 g neoarsphenamine; Feb. 21, 28, and Mar. 7, 0.6 g neoarsphenamine.	5 days	1933	
40	37	2 months	15 days	Feb. 23, 1933, to Mar. 28, 1933, 9 injections neoarsphenamine, total 4.5 g; the last injection 0.6 g.	15 days	1933	
41	24	Unknown	3 minutes	Apr. 14, 1934, to May 12, 1934, 5 injections neoarsphenamine, the last of 0.6 g.	6 hours	1934	Edema and hemorrhages.
42	34	10 years	29 days	1924–33, inclusive, 20 injections arsenicals; Feb. 3, 1934, to Apr. 7, 1934, 8 injections neoarsphenamine.	Unknown	1934	
43	23	2 months	3 days	Mar. 12, 1934, to Apr. 17, 1934, 6 injections neoarsphenamine.	1 month	1934	Edema
44	28	3 months	4 days	Oct. 19, 1934, to Nov. 13, 1934, 2.1 g neoarsphenamine; Dec. 5, 1934, to Jan. 29, 1935, 8 injections neoarsphenamine, *total* 4.5 g.	9 days	1935	

States Navy, 1919–35—Post-mortem findings in 44 cases—Continued

Post-mortem findings					
Liver	Kidneys	Lungs	Heart	Spleen	Remarks
Congestion	Congestion			Congestion	
Hemorrhages	Hemorrhages	Hemorrhages	Hemorrhages	Hemorrhages	Hemorrhagic infiltration of all tissues including pancreas.
Congestion	Congestion	Slight edema	Right dilated; petechial hemorrhages in myocardium.		
Small with nutmeg mottling.	Enlarged, pale, and hemorrhagic areas, lower pole.	Hemorrhagic			
Acute yellow atrophy.	Acute parenchymatous nephritis.	Edema with much fluid in pleural cavity.	Degeneration	Degeneration	Degeneration adrenals.
Fatty degeneration.	Diffuse granular changes.	Edema and patches of bronchopneumonia.	Degeneration of muscle.		Minute petechial hemorrhages in stomach wall. Exfoliative dermatitis.
	Congestion	Edema		Congestion	Petechial hemorrhages, small intestines.
Degeneration	Petechial hemorrhages, right kidney.	Bloody fluid in pleural cavity.	Hemorrhage of muscle.		Degeneration of adrenals; acellular bone marrow.
Edema	Edema	Edema	Dilatation right heart.		Hemorrhages in skin; exfoliative dermatitis.
Hypoplastic and fatty infiltration.	Parenchymatous nephritis.	Pneumonia, left lower lobe.		Passive congestion.	Ulcerations of nose and mouth.

DEATHS DURING WEEK ENDED JUNE 20, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 20, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,736	7,831
Deaths per 1,000 population, annual basis	10.8	10.9
Deaths under 1 year of age	506	563
Deaths under 1 year of age per 1,000 estimated live births	46	51
Deaths per 1,000 population, annual basis, first 25 weeks of year	13.0	12.3
Data from industrial insurance companies:		
Policies in force	68,692,630	67,863,479
Number of death claims	12,132	12,297
Death claims per 1,000 policies in force, annual rate	9.2	9.4
Death claims per 1,000 policies, first 25 weeks of year, annual rate	10.6	10.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 27, 1936, and June 29, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 27, 1936, and June 29, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935
New England States								
Maine				1	218	183	0	0
New Hampshire					26	2	0	0
Vermont		1			146	35	0	0
Massachusetts	5	10			582	318	2	0
Rhode Island	1	1			3	222	0	0
Connecticut		19	2		49	301	0	0
Middle Atlantic States:								
New York	34	39	[1] 4		1,476	2,063	15	15
New Jersey	7	15	6	3	304	1,020	1	1
Pennsylvania	25	31			1,134	988	5	11
East North Central States:								
Ohio	20	30	6	23	439	1,278	3	8
Indiana	5	11	8	9	10	54	3	1
Illinois	39	44	28	11	28	747	7	11
Michigan	12	6		1	50	1,423	1	3
Wisconsin	2	3	11	30	159	1,178	0	2
West North Central States:								
Minnesota	5	1	1	1	123	63	3	1
Iowa	2	4			3	41	2	1
Missouri	15	16	8	35	20	104	1	2
North Dakota		1		11	6	11	0	1
South Dakota						11	0	9
Nebraska	2				8	63	0	0
Kansas	2	5	9	9	7	139	1	0
South Atlantic States:								
Delaware	8	1			9	9	1	0
Maryland [3]	5	4	1	2	211	61	2	0
District of Columbia	5	9		1	133	9	0	4
Virginia [3]	4	6			46	150	2	4
West Virginia	7	11	11	14	12	105	8	2
North Carolina	13	9	5		5	31	4	4
South Carolina [4]	4	3	41	58	11	18	0	1
Georgia [4]	7	11					8	0
Florida [4]		9	2		7	8	2	6

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 27, 1936, and June 29, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935
East South Central States:								
Kentucky	10	4	3	2	21	25	9	5
Tennessee [4]	1	9	17	8	13	14	2	2
Alabama [4]	8	13	7	18	7	49	2	1
Mississippi [2, 4]	5	9	------	------	------	------	0	1
West South Central States:								
Arkansas	4	4	3	6	------	8	0	0
Louisiana	4	9	14	5	3	5	2	2
Oklahoma [5]	4	9	8	19	4	8	1	0
Texas [4]	20	26	59	24	100	50	4	0
Mountain States:								
Montana [3]	2	4	12	2	4	85	1	0
Idaho [3]	------	------	------	1	13	4	0	1
Wyoming [3]	------	------	------	------	1	11	0	0
Colorado [3]	3	9	------	------	10	106	5	0
New Mexico	1	------	1	------	39	3	0	0
Arizona	2	------	------	------	97	------	1	1
Utah [2]	------	------	------	------	3	6	0	1
Pacific States:								
Washington	------	------	1	------	133	239	1	2
Oregon [3]	1	------	10	16	14	84	0	1
California [4]	20	34	466	26	1,201	665	8	5
Total	309	430	747	336	6,908	12,045	104	94
First 26 weeks of year	13,098	15,531	139,713	102,317	253,856	658,253	5,458	3,630

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935
New England States:								
Maine	0	0	11	10	0	0	1	5
New Hampshire	0	1	1	3	0	0	0	0
Vermont	0	0	4	4	0	0	0	0
Massachusetts	0	3	143	162	0	0	5	0
Rhode Island	0	0	27	10	0	0	0	2
Connecticut	0	1	22	50	0	0	2	1
Middle Atlantic States:								
New York	3	8	292	418	2	0	13	11
New Jersey	0	3	106	75	0	0	7	0
Pennsylvania	1	3	223	241	0	0	13	10
East North Central States:								
Ohio	1	1	121	204	0	0	7	16
Indiana	0	0	37	41	3	2	5	5
Illinois	3	2	262	459	27	0	2	22
Michigan	1	1	228	136	1	0	6	6
Wisconsin	0	1	173	230	6	6	2	0
West North Central States:								
Minnesota	0	0	122	98	11	3	0	30
Iowa	0	0	61	31	8	15	1	9
Missouri	0	0	67	14	11	0	18	16
North Dakota	0	0	13	19	5	0	0	3
South Dakota	0	0	11	3	3	14	0	0
Nebraska	0	0	26	8	24	23	0	2
Kansas	1	0	68	23	11	19	1	7
South Atlantic States:								
Delaware	0	0	2	3	0	0	0	1
Maryland [2]	0	0	19	31	0	0	2	4
District of Columbia	0	0	6	7	0	0	0	3
Virginia [3]	0	21	12	15	1	0	8	18
West Virginia	0	0	8	36	0	0	4	3
North Carolina	1	63	11	14	1	0	12	43
South Carolina [4]	1	2	------	2	0	0	10	17
Georgia [4]	0	1	4	6	0	0	23	34
Florida [4]	2	0	1	5	0	0	1	9

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 27, 1936, and June 29, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935	Week ended June 27, 1936	Week ended June 29, 1935
East South Central States:								
Kentucky	0	1	12	22	0	1	11	18
Tennessee [4]	0	1	5	12	2	0	18	27
Alabama [4]	7	5	3	11	0	1	20	30
Mississippi [2 4]	0	0	6	10	0	0	21	16
West South Central States:								
Arkansas	0	0	--------	3	0	0	8	17
Louisiana	1	4	--------	6	0	6	20	23
Oklahoma [5]	0	0	--------	8	1	0	6	9
Texas [4]	2	0	32	21	0	2	15	35
Mountain States:								
Montana [3]	0	1	22	10	47	2	1	2
Idaho [3]	0	0	5	2	3	0	3	1
Wyoming [3]	0	0	3	7	1	10	0	0
Colorado [3]	0	0	13	44	0	1	3	2
New Mexico	0	0	13	3	1	0	10	6
Arizona	0	0	8	7	0	0	6	3
Utah [2]	0	0	6	50	0	0	0	0
Pacific States:								
Washington	1	0	30	30	3	35	3	3
Oregon [3]	0	1	26	20	2	10	5	1
California [4]	7	33	199	128	1	2	17	8
Total	32	160	2,464	2,743	175	152	310	499
First 26 weeks of year	508	1,025	174,633	171,478	5,750	4,852	3,617	4,583

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended June 27, 1936, 10 cases, as follows: Virginia, 2; Montana, 2; Idaho, 2; Wyoming, 1; Colorado, 1; Oregon, 2.
[4] Typhus fever, week ended June 27, 1936, 38 cases, as follows: South Carolina, 1; Georgia, 19; Florida, 1; Tennessee, 2; Alabama, 10; Mississippi, 1; Texas, 2; California, 2.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1936										
Puerto Rico	--------	34	8,549	631	50	3	0	--------	0	43
May 1936										
Alabama	9	49	458	322	74	61	1	20	1	12
Louisiana	13	38	868	145	176	13	0	18	1	28
Mississippi	1	21	2,088	5,266	397	--------	2	32	1	--------
Nevada	1	--------	7	--------	10	--------	0	47	0	2
Oklahoma [1]	8	26	313	154	114	45	0	195	8	23
Oregon	1	7	101	1	779	--------	0	114	43	11
South Dakota	2	8	5	--------	15	--------	0	217	110	0
Vermont	--------	3	--------	--------	1,772	--------	0	17	0	5
Washington	3	4	26	--------	1,629	--------	0	273	19	12
Wisconsin	4	18	125	--------	840	--------	2	1,459	30	4

[1] Exclusive of Oklahoma City and Tulsa.

April 1936

	Cases
Puerto Rico:	
Chicken pox	46
Dysentery	22
Mumps	17
Ophthalmia neonatorum	4
Tetanus	14
Tetanus, infantile	4
Whooping cough	44

May 1936

	Cases
Actinomycosis:	
Oregon	1
Chicken pox:	
Alabama	192
Louisiana	19
Mississippi	160
Nevada	16
Oklahoma [1]	41
Oregon	123
South Dakota	67
Vermont	63
Washington	292
Wisconsin	1,325
Dengue:	
Mississippi	1
Dysentery:	
Alabama (amoebic)	1
Louisiana (amoebic)	8
Mississippi (amoebic)	52
Mississippi (bacillary)	1,485
Oklahoma [1]	3
Oregon (amoebic)	1
Epidemic encephalitis:	
Alabama	1
Oklahoma [1]	1
Oregon	2
Washington	7
Wisconsin	2
German measles:	
Vermont	50
Washington	467
Wisconsin	147

May 1936—Continued

	Cases
Hookworm disease:	
Louisiana	16
Mississippi	342
Impetigo contagiosa:	
Oklahoma [1]	2
Oregon	29
Washington	1
Leprosy:	
Louisiana	2
Mumps:	
Alabama	332
Louisiana	48
Mississippi	1,160
Nevada	1
Oklahoma [1]	74
Oregon	82
South Dakota	24
Vermont	154
Washington	241
Wisconsin	2,155
Ophthalmia neonatorum:	
Alabama	4
Oklahoma [1]	2
Wisconsin	1
Paratyphoid fever:	
Louisiana	2
Puerperal septicemia:	
Mississippi	14
Rabies in animals:	
Louisiana	18
Mississippi	16
Oklahoma [1]	3
Oregon	7
Washington	13
Rabies in man:	
Mississippi	1
Rocky Mountain spotted fever:	
Alabama	1
Nevada	5
Oregon	13

May 1936—Continued

	Cases
Scabies:	
Oklahoma [1]	7
Oregon	19
Septic sore throat:	
Louisiana	3
Oklahoma [1]	29
Oregon	13
Washington	2
Wisconsin	20
Tetanus:	
Alabama	7
Louisiana	1
Oklahoma [1]	3
Trachoma:	
Mississippi	9
Oregon	1
Tularaemia:	
Louisiana	6
Typhus fever:	
Alabama	15
Undulant fever:	
Alabama	7
Louisiana	2
Nevada	1
Oklahoma [1]	3
Vermont	3
Washington	2
Wisconsin	4
Vincent's infection:	
Oklahoma [1]	2
Oregon	7
Washington	1
Whooping cough:	
Alabama	106
Louisiana	238
Mississippi	465
Nevada	13
Oklahoma [1]	34
Oregon	123
South Dakota	4
Vermont	43
Washington	154
Wisconsin	127

[1] Exclusive of Oklahoma City and Tulsa.

HUMAN AND RODENT PLAGUE IN MODOC, MONTEREY, AND SANTA CRUZ COUNTIES, CALIF.

Under date of June 26, 1936, the Director of Public Health of California reported a male patient from Monterey County, Calif., recovering at San Luis Obispo Hospital from glandular plague. Infection was confirmed bacteriologically and by animal inoculation.

The Director of Public Health of California has also reported plague infection proved in 21 squirrels received at the laboratory on June 19 and 20 from ranches in Santa Cruz County 4 to 8 miles east of Watsonville, and in 4 squirrels from Modoc County. One of the squirrels from Modoc County was received at the laboratory on June 17 from a place 3 miles north and 2 miles west of Davis Creek; two were received June 20 from a ranch 10 miles south of Pine Creek, in Fandango Valley, and one received at the laboratory on June 19, was found dead in Modoc National Forest ½ mile northwest of Hackamore.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 20, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	174	3	3	0	1	0	1	28
New Hampshire:											
Concord	0		0	0	2	0	0	0	0	0	5
Nashua	0			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	11	0	0	0	0	0	0	8
Rutland	0		0	4	0	1	0	0	0	0	3
Massachusetts:											
Boston	8		0	190	9	37	0	7	1	28	182
Fall River	0		0	2	2	3	0	1	0	1	31
Springfield	0		0	3	1	3	0	1	0	2	27
Worcester	0		0	89	2	9	0	2	0	2	44
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	
Providence	0		0	4	1	9	0	2	0	7	42
Connecticut:											
Bridgeport	0		0	2	0	0	0	0	0	3	18
Hartford	0		0	1	3	3	0	2	4	1	43
New Haven	0		0	0	1	0	0	1	0	21	37
New York:											
Buffalo	1		0	127	6	24	0	7	2	7	112
New York	38	4	3	991	71	191	0	76	4	85	1,313
Rochester	0		0	0	7	0	0	0	2	2	59
Syracuse	0		0	33	2	20	0	0	0	24	44
New Jersey:											
Camden	1		0	10	4	2	0	1	0	2	30
Newark	0		0	24	6	28	0	5	1	24	94
Trenton	0		0	2	5	2	0	0	0	3	39
Pennsylvania:											
Philadelphia	4	1	0	371	17	53	0	13	1	97	382
Pittsburgh	3		0	6	15	91	0	6	0	49	160
Reading	0		0	11	2	1	0	0	0	4	27
Scranton	0			1		0	0		0	0	
Ohio:											
Cincinnati	4		1	8	7	11	0	13	0	1	127
Cleveland	1	2	0	132	14	19	0	8	0	67	201
Columbus	1	1	1	2	5	1	0	4	0	7	71
Toledo	0		0	19	3	8	0	2	0	30	59
Indiana:											
Anderson	0		0	0	1	9	0	0	0	2	9
Fort Wayne	0		0	0	5	3	0	0	0	0	33
Indianapolis	0		1	5	7	8	0	3	0	7	85
Muncie	0		0	0	1	6	0	0	0	0	11
South Bend	0		0	0	1	1	0	0	0	1	13
Terre Haute	2		0	0	0	3	0	2	0	0	12
Illinois:											
Alton	2		0	1	1	2	0	0	0	1	9
Chicago	27	2	2	13	88	136	0	49	2	83	652
Elgin	0		0	0	0	0	0	0	0	1	4
Moline	0		0	0	0	0	0	0	0	1	8
Springfield	0	1	1	0	1	0	0	0	0	0	27
Michigan:											
Detroit	9		0	85	16	158	1	16	1	196	246
Flint	0		0	0	0	2	0	0	0	2	24
Grand Rapids	0		0	1	0	3	0	0	0	3	33
Wisconsin:											
Kenosha	0		0	0	0	4	1	0	0	2	8
Milwaukee	0	1	1	16	7	78	0	1	2	76	84
Racine	0		0	1	0	0	1	0	0	0	17
Superior	0		0	0	0	0	4	0	0	0	3
Minnesota:											
Duluth	0		0	1	1	10	0	3	0	7	34
Minneapolis	3		1	38	3	37	0	1	0	2	102
St. Paul	0		0	49	1	9	0	2	0	1	54

See footnotes at end of table.

City reports for week ended June 20, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0			0		1	0		0	4	
Davenport	1			0		3	0		0	0	
Des Moines	1			0		6	1		0	0	30
Sioux City	0			0		5	4		0	0	
Waterloo	0			0		3	0		0	0	
Missouri:											
Kansas City	4		0	1	1	27	0	2	0	4	82
St. Joseph											
St. Louis	4		0	5	6	23	0	13	2	13	191
North Dakota:											
Fargo	0		0	0	1	5	0	0	0	0	10
Grand Forks	0			0		0	0		0	0	
Minot	0			1		1	1		0	0	5
South Dakota:											
Aberdeen	0			0		7	0		0	0	
Sioux Falls	0			0		0	0		0	0	6
Nebraska:											
Omaha	0		0	2	5	15	3	1	0	0	53
Kansas:											
Lawrence	0		0	0	1	3	0	0	0	0	9
Topeka	0		0	0	0	11	0	0	0	1	19
Wichita	1		0	0	2	12	0	0	1	1	33
Delaware:											
Wilmington	0		0	6	1	0	0	0	0	3	22
Maryland:											
Baltimore	5		0	198	13	17	0	4	1	72	185
Cumberland	0		0	0	3	0	0	0	0	0	10
Frederick	0		0	1	0	0	0	0	0	0	4
District of Columbia:											
Washington	14		0	107	12	5	0	15	2	49	154
Virginia:											
Lynchburg	1		0	1		1	0	1	0	4	9
Norfolk	1		0	0	1	0	0	2	0	0	16
Richmond	0		0	0	4	3	0	3	0	0	68
Roanoke	1		0	1	2	0	0	0	0	0	16
West Virginia:											
Charleston	0		0	1	0	0	0	1	0	0	17
Huntington	1		0	0	0	0	0	0	0	0	
Wheeling	0		0	4	2	2	0	0	0	1	17
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh	0		0	0	1	0	0	1	0	1	12
Wilmington	0		0	0	0	0	0	0	0	0	6
Winston-Salem	0		0	5	1	0	0	1	1	0	13
South Carolina:											
Charleston	0		0	0	0	0	0	0	2	1	21
Columbia											
Florence	0		0	0	3	0	0	0	0	6	18
Greenville											
Georgia:											
Atlanta	1	1	1	1	8	4	0	3	1	1	83
Brunswick	0		0	0	0	1	0	0	0	0	1
Savannah	1		0	0	0	0	0	1	0	0	33
Florida:											
Miami	0	4	1	2	0	0	0	3	0	0	23
Tampa	0	1	1	1	3	1	0	0	1	0	23
Kentucky:											
Ashland	0		2	0	2	0	0	1	0	0	16
Covington	0		0	3	0	0	0	0	0	0	15
Lexington	0		0	0	2	0	0	1	0	1	19
Louisville	0		0	7	6	10	0	5	0	2	99
Tennessee:											
Knoxville	0		0	1	1	0	0	3	0	0	25
Memphis	2		0	0	5	1	0	1	2	11	66
Nashville	0		1	0	4	0	0	2	0	0	56
Alabama:											
Birmingham	1		0	1	8	0	0	2	3	0	92
Mobile	0		0	0	1	0	0	0	0	0	19
Montgomery	0	1		0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		1	0	
Little Rock	0		0	0	3	0	0	2	0	0	7
Louisiana:											
Lake Charles	0		0	1	0	0	0	0	0	0	8
New Orleans	10	8	3	0	13	1	0	22	1	42	183
Shreveport	0		0	0	2	0	0	1	5	1	45
Oklahoma:											
Oklahoma City	0	3	0	0	0	4	0	1	0	2	52
Tulsa	0			0		2	0		0	3	

See footnotes at end of table.

City reports for week ended June 20, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	2		0	32	1	2	0	1	1	2	68
Fort Worth	0		2	5	0	1	0	0	0	0	60
Galveston	0		0	0	4	1	0	1	0	0	19
Houston	5		2	1	1	2	0	7	0	0	74
San Antonio	1		0	3	6	0	0	8	0	0	72
Montana:											
Billings	0		0	9	0	2	0	0	0	1	9
Great Falls	0		0	0	0	1	0	0	0	11	4
Helena	0		0	1	0	0	1	0	0	0	1
Missoula	0		0	0	1	0	0	0	0	0	6
Idaho:											
Boise	0		0	2	1	0	0	0	0	0	7
Colorado:											
Colorado Springs	1		0	1	1	2	0	0	0	0	7
Denver	1		0	18	7	5	0	6	0	41	86
Pueblo	0		0	0	1	1	0	0	0	4	4
New Mexico:											
Albuquerque	0		0	5	0	5	0	3	0	0	11
Utah:											
Salt Lake City	0		0	35	1	10	4	1	0	3	87
Nevada:											
Reno											
Washington:											
Seattle	0		0	97	6	2	0	4	0	6	85
Spokane	0		0	10	0	14	0	0	1	8	20
Tacoma	0		0	16	0	2	0	0	0	0	21
Oregon:											
Portland	0		0	4	5	6	0	2	0	5	67
Salem	0	3		5		0	0		0	0	
California:											
Los Angeles	8	3	0	135	12	27	0	22	0	74	311
Sacramento	0		0	2	1	4	0	3	1	22	35
San Francisco	0		0	81	5	53	0	4	0	9	157

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	1	0
Rhode Island:			
Providence	3	1	1
New York:			
Buffalo	0	0	1
New York	5	2	0
Rochester	1	0	0
Syracuse	0	1	0
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	2	1	0
Pittsburgh	1	1	0
Ohio:			
Cincinnati	0	1	0
Cleveland	1	0	0
Illinois:			
Chicago	3	3	0
Missouri:			
St. Louis	1	0	0
Maryland:			
Baltimore	4	1	0
Cumberland	0	1	0
District of Columbia:			
Washington	1	1	0
Virginia:			
Norfolk	3	0	0
Roanoke	0	1	0
West Virginia:			
Wheeling	1	0	0
North Carolina:			
Wilmington	1	1	0
South Carolina:			
Charleston	1	1	0
Kentucky:			
Ashland	2	0	0
Alabama:			
Birmingham	1	0	1
Arkansas:			
Little Rock	0	1	0
Louisiana:			
New Orleans	1	0	0
Oklahoma:			
Oklahoma City	1	0	0
Texas:			
Houston	1	0	0
Utah:			
Salt Lake City	1	1	1
Oregon:			
Portland	1	0	0
California:			
Los Angeles	2	3	1

Epidemic encephalitis.—Cases: St. Paul, 1; Denver, 1.
Pellagra.—Cases: Winston-Salem, 1; Charleston, S. C., 1; Birmingham, 1; Mobile, 1; Montgomery, 1; Dallas, 1; Los Angeles, 1.
Rabies in man.—Deaths: St. Louis, 1; Oklahoma City, 1.
Typhus fever.—Cases: Atlanta, 1; Knoxville, 1.

BRITISH WEST INDIES

Barbados—Vital statistics—1935.—The following table shows the vital statistics for Barbados, British West Indies, for the year 1935:

Number of marriages	831
Number of marriages per 1,000 population	9. 06
Number of births	5, 315
Number of births per 1,000 population	28. 94
Number of stillbirths	139
Number of deaths	3, 702
Number of deaths per 1,000 population	20. 16
Deaths under 1 year of age	1, 169
Average deaths under 1 year of age per 1,000 births	220

CANADA

Provinces—Communicable diseases—2 weeks ended June 13, 1936.—During the 2 weeks ended June 13, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		2		1			3	7
Chicken pox		14		196	390	79	44	45	65	842
Diphtheria		6	2	37	2	3	2	1	1	54
Dysentery				5	20					25
Erysipelas				10	8	3	2	2	4	29
Influenza		8			207	49	3		3	269
Lethargic encephalitis						1				1
Measles		16	31	566	1, 730	352	132	235	383	3, 445
Mumps		28			696	28	73	57	176	1, 058
Paratyphoid fever					1				2	3
Pneumonia	12	7			17		9		5	50
Poliomyelitis					3					3
Scarlet fever		11	1	117	361	127	40	108	24	789
Smallpox								2		2
Trachoma						1	1		5	7
Tuberculosis	6	16	35	126	95	63	30	19	82	422
Typhoid fever			3	41	4	7	1	4	4	64
Undulant fever				1	3					4
Whooping cough	1	19	9	79	258	7	38	5	63	479

Vital statistics—Fourth quarter 1935.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the fourth quarter of 1935. The rates are computed on an annual basis. There were 18.6 live births per 1,000 population during the fourth quarter of 1935 and 19.2 per 1,000 population in the same quarter of 1934. The death rate was 9.2 per 1,000 population for the fourth quarter of 1935 and 9.3 per 1,000 population for the fourth quarter of 1934. The infant mortality rate for the fourth quarter of

1935 was 66 per 1,000 live births and 75 in the corresponding quarter of 1934. The maternal death rate was 4.5 per 1,000 live births for the fourth quarter of 1935, and 5.2 for the same quarter of 1934.

The accompanying tables give the number of births, deaths, and marriages by Provinces for the fourth quarter of 1935, and deaths from certain causes in Canada for the fourth quarter of 1935, and the corresponding quarter of 1934, and by Provinces for the fourth quarter of 1935.

Number of births, deaths, and marriages, fourth quarter 1935

Province	Live births	Deaths (exclusive of still-births)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	51,369	25,344	3,368	231	22,743
Prince Edward Island	500	251	38	1	190
Nova Scotia	2,600	1,377	173	11	1,228
New Brunswick	2,377	1,151	178	8	966
Quebec	17,136	7,850	1,491	98	5,034
Ontario	14,577	8,762	766	53	7,290
Manitoba	3,189	1,444	175	14	1,837
Saskatchewan	4,626	1,414	239	16	2,754
Alberta	3,973	1,373	187	18	2,011
British Columbia	2,391	1,722	121	12	1,433

[1] Exclusive of Yukon and the Northwest Territories.

Number of deaths, Canada, fourth quarter 1934 and 1935, and by Provinces, fourth quarter 1935

Cause of death	Canada [1] (fourth quarter)		Province, fourth quarter 1935								
	1934	1935	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	337	394	1	21	13	102	197	14	4	11	31
Cancer	2,789	2,734	20	139	110	704	1,025	209	148	157	222
Diarrhea and enteritis	1,045	557	4	24	25	325	106	26	23	15	9
Diphtheria	71	109	-	7	7	78	9	3	3	1	1
Diseases of the arteries	1,864	2,210	18	143	76	485	1,060	133	77	110	158
Diseases of the heart	4,142	4,095	35	201	150	998	1,741	227	221	195	327
Homicides	37	31	-	2	-	6	8	3	3	6	3
Influenza	489	555	2	27	14	273	131	28	25	33	22
Measles	83	94	4	2	13	33	23	-	5	12	2
Nephritis	1,364	1,477	13	67	45	640	458	70	68	46	70
Pneumonia	1,581	1,847	32	89	116	619	561	113	126	97	94
Poliomyelitis	24	9	-	-	-	3	1	1	2	2	-
Puerperal causes	273	231	1	11	8	98	53	14	16	18	12
Scarlet fever	79	60	1	3	2	34	13	3	4	-	-
Smallpox	1	3	-	-	-	-	-	-	1	-	2
Suicides	234	222	1	4	3	34	85	12	25	28	30
Tuberculosis	1,421	1,441	9	114	74	578	.287	90	62	79	148
Typhoid fever and paratyphoid fever	82	79	2	2	7	45	10	2	5	4	2
Other violent deaths	1,001	1,008	8	59	47	223	374	53	61	81	102

[1] Exclusive of Yukon and the Northwest Territories.

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended March 28, 1936.—During the 13 weeks ended March 28, 1936, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	16,061	Puerperal pyrexia	1,532
Ophthalmia neonatorum	1,067	Scarlet fever	31,371
Pneumonia	18,781	Typhoid fever	270
Puerperal fever	395		

England and Wales—Vital statistics—First quarter 1936.—During the quarter ended March 31, 1936, 148,136 live births and 153,583 deaths were registered in England and Wales. The following vital statistics are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar General of England and Wales. The figures are provisional.

Birth and death rates in England and Wales, quarter ended Mar. 31, 1936

Annual rates per 1,000 population:	
Live births	14.70
Stillbirths	.63
Deaths, all causes	15.20
Deaths under 1 year of age	[1] 80
Deaths from:	
Diarrhea and enteritis (under 2 years of age)	[1] 6.3
Diphtheria	.09
Influenza	.28
Measles	.12
Scarlet fever	.02
Violence	.54
Whooping cough	.07

[1] Per 1,000 live births.

ITALY

Communicable diseases—4 weeks ended April 26, 1936.—During the 4 weeks ended April 26, 1936, cases of certain communicable diseases were reported in Italy, as follows:

Disease	Mar. 30-Apr. 5		Apr. 6-12		Apr. 13-19		Apr. 20-26	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	11	9	8	8	5	5	15	15
Cerebrospinal meningitis	37	32	16	13	20	17	29	26
Chicken pox	429	159	367	159	319	134	301	115
Diphtheria and croup	424	244	371	214	423	230	418	218
Dysentery	6	5	5	4	7	7	2	2
Hookworm disease	9	4	7	4	10	7	9	5
Leishmaniasis	1	1	7	6			2	2
Lethargic encephalitis	2	2	2	2	3	3	1	1
Measles	2,510	330	1,894	288	1,917	310	1,768	311
Mumps	386	104	306	98	357	90	368	101
Paratyphoid fever	18	18	31	26	32	27	19	17
Poliomyelitis	16	14	16	12	23	14	16	13
Puerperal fever	45	39	32	30	24	23	31	29
Rabies			1	1				
Scarlet fever	270	120	265	128	237	121	240	116
Typhoid fever	198	129	230	108	195	124	228	148
Undulant fever	90	57	93	63	93	59	117	76
Whooping cough	536	134	459	120	626	135	694	166

YUGOSLAVIA

Communicable diseases—May 1936.—During the month of May 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	28	6	Paratyphoid fever	7	
Cerebrospinal meningitis	13	9	Scarlet fever	352	11
Diphtheria and croup	493	39	Sepsis	8	6
Dysentery	22		Tetanus	49	24
Erysipelas	232	10	Typhoid fever	227	25
Influenza	24	1	Typhus fever	125	7
Measles	637	4			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 26, 1936, pages 858–870. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

India—Bombay.—During the week ended June 20, 1936, one death from plague was reported at Bombay, India.

United States—California.—A report of plague in California appears on page 930 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Algeria—Oran Department.—During the week ended June 6, 1936, one case of smallpox was reported in Oran Department, Algeria.

Typhus fever

Algeria—Philippeville.—During the week ended June 6, 1936, one case of typhus fever was reported at Philippeville, Algeria.

Yellow fever

Brazil.—Yellow fever has been reported in Brazil as follows: Amazonas State, Labrea, March 28, 1936, one case, one death; Matto Grosso State, Tres Lagoas, April 23, 1936, one case, one death; Minas Geraes State, Uberaba, May 21, 1936, one case, one death; Fructal, May 30, 1936, one case, one death; Sao Paulo State, Serra Negra, May 18, 1936, one case, one death, Altinopolis, May 19, 1936, one case, one death.

Senegal.—On June 18, 1936, one case of yellow fever was reported at Thies, Senegal, and on June 11, 1936, one suspected case of yellow fever was reported at Tivaouane, Senegal.

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UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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IMPORTANT CAUSES OF SICKNESS AND DEATH [1] [2]

By ROLLO H. BRITTEN, *Senior Statistician, United States Public Health Service*

What are the most important diseases that result in sickness and death at the present time? On casual thought, this question seems easily answered. Sickness is reported to health departments; deaths are registered and analyzed currently; perusal of a few volumes should give the answers. All students of the subject know, however, that there is no simple answer; or, rather, that there are too many answers. Perhaps there needs to be a clearer understanding that there are many approaches and that the relative importance to be attached to a disease will depend on the point of view. The aim of this review is to indicate what some of these approaches are and the various pictures that they yield. For instance, it will be found that one picture is given by records of mortality, another by those of acute illness, another by those of chronic disease, another by medical examinations. These different approaches have been represented in a series of nineteen charts, covering many different phases, some much more significant than others, but all worth a certain amount of consideration in evaluating the importance of any one disease as a cause of ill health or death.

In order to make the material as useful as possible, a composite ranking of diseases and conditions has been attempted. Methods of arriving at this summary will be explained later. It is presented simply as a first approximation, to help in clarifying somewhat the confusion of dealing with so many different points of view.

A few considerations are of special significance in evaluating this material. First, many conditions of grave importance may not be of such a character as to be revealed by standard methods of approach. Their importance, however, might well be shown by special surveys. Thus, information derived from these charts must be supplemented

[1] The data utilized in this paper were prepared in connection with the work of a committee appointed by Asst. Surg. Gen. L. R. Thompson to assist in the formulation of criteria for research projects in public health, the members of the committee being Medical Director J. P. Leake, Principal Statistician G. St. J. Perrott, and the writer.

[2] Acknowledgment is made to Junior Statistician Jennie C. Goddard for help in assembling the data.

in the mind of the reader by special knowledge or by realization of the potential hazard in specific public health problems. Second, the fact that one cause will be at or near the top in one of these graphs and much further down in another, or absent entirely, does not imply any inconsistencies in the material, but rather that, as stated, different methods of approach emphasize different conditions. Third, no attempt is made to include any but the major causes from these points of view, otherwise, no summary in brief space would be possible. Fourth, it has not seemed useful for the present purpose to summarize omitted conditions by broad groups of causes, because of the arbitrariness of such groups. Fifth, although the attempt is made to deal with specific causes, it is not possible to do this literally except

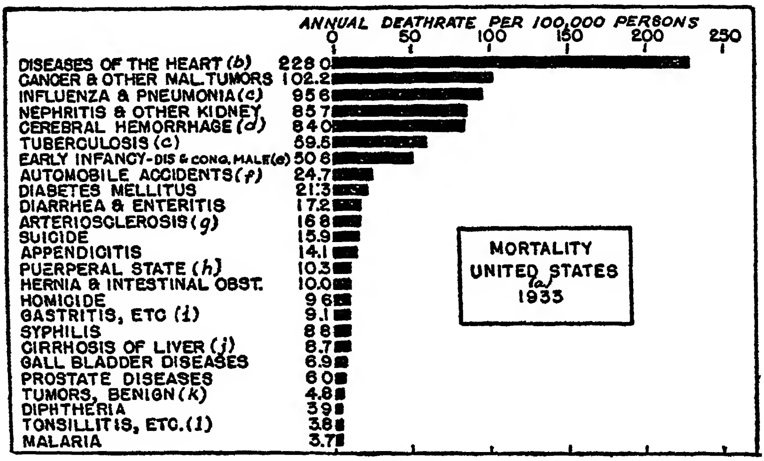

FIGURE 1.

(Explanatory references to the graphs, figs. 1-19, will be found in the Appendix, pp. 966-969.)

in a few instances. Most of the causes given represent groups of diseases. Sixth, many detailed qualifications would be necessary for a thorough evaluation of the data given. Since our purpose is merely to provide a list of conditions which seem important by reason of their great prevalence or incidence, the reader must be referred to the publications covering the different sets of material for such detailed discussions, although the following paragraphs will broadly distinguish one source of data from another. No attempt will be made to discuss the implications of the material.

MORTALITY

Figure 1 gives the rate of mortality for the whole United States in 1933 by cause. (In the consideration of the detailed entries in each chart, attention is specifically called to the explanatory references in the appendix.) The rates listed cover 81 percent of the deaths for

the given year. No particular explanation of data of this character seems necessary, except to say that primary causes only are mentioned (where joint causes of death appear on a death certificate, the Census Bureau follows specific rules for selecting the primary cause). Some of these causes (notably influenza and pneumonia, diarrhea and enteritis, and diseases of the heart) would be markedly increased if contributory causes were added.[3]

Since diseases of the heart appear most important as a cause of death by a wide margin, it will be of interest to note the relative importance of various forms of heart disease as classified from the death certificates: Chronic myocarditis, 75.4 per 100,000 persons; chronic endocarditis, valvular diseases, 46.9; functional diseases,

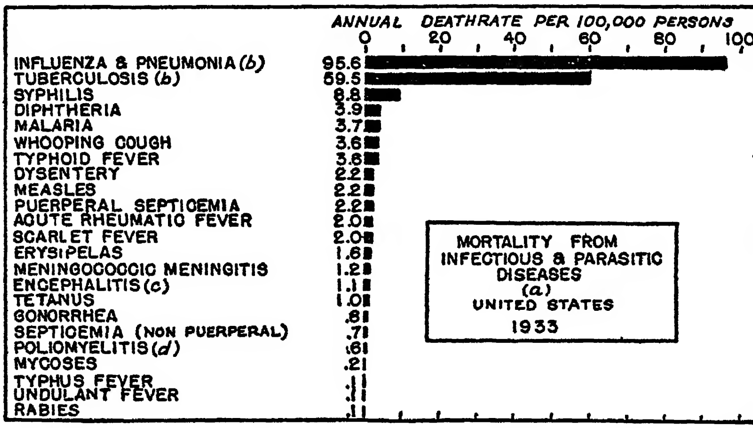

FIGURE 2.

35.3; diseases of coronary arteries, 21.9; angina pectoris, 15.9; and other, 32.6. No information as to etiology is possible from such data.

Certain of these diseases offer methods of control applicable to groups of the population as a whole and are, therefore, from a public health point of view, of more importance than others. Accordingly, figure 2 presents the rates of mortality for a group of diseases (infectious and parasitic) which are fundamentally of this character. No special comment is necessary, except to the effect that many diseases not included in the list have a relation to those which are included, because of the part that infection plays in their development (notably those in the heart-disease group).

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[3] The last year for which such data are available is 1925. Inclusion of deaths for which the cause was classified as contributory would increase the various causes of death by the following percentages: Influenza and pneumonia, 40 percent; diarrhea and enteritis (2 years and over), 37 percent; diseases of the heart, 31 percent; chronic nephritis, 20 percent; cerebral hemorrhage, 19 percent; cancer, 13 percent; automobile accidents, 9 percent; diabetes, 8 percent; tuberculosis, 0.3 percent; suicide, 0.3 percent (disregarding cases where another disease within a specified group is given as contributory). Were correction made on this basis, the order would not be materially changed, but the importance of the first five causes in the list would be further emphasized.

Which diseases will appear at the top of any list based on records of illness depends almost wholly on the method of approach. On the one hand, there are the technical methods by which we secure the

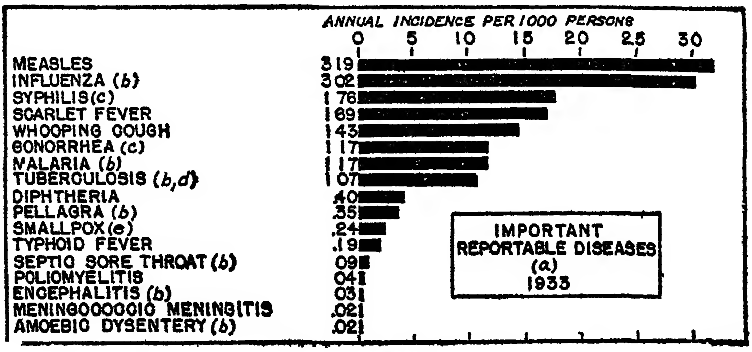

FIGURE 3

information (reports of notifiable diseases, house-to-house surveys, etc), on the other, we may have under consideration the number of cases due to a specific cause, or their severity measured in terms of days disabled, days in bed, cost, etc. The present purpose will be served by graphs giving the important causes from each of the various

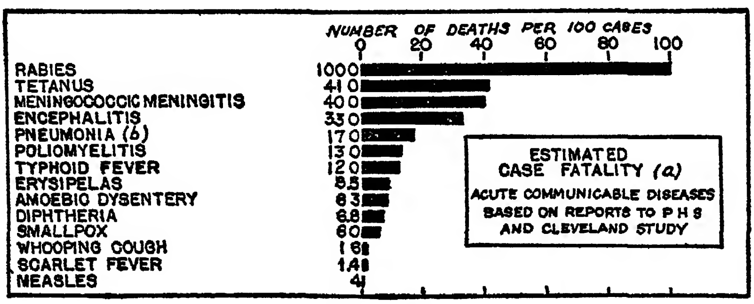

FIGURE 4

points of view, with a minimal discussion of the different interpretations to be placed on them.

In figure 3 the rate of reported incidence of one type of disease is shown. This is based on reports by the States to the Public Health Service, and covers those diseases which are by law notifiable in the various States. They are all communicable diseases (with one exception). They are mostly of an epidemic character. To a large extent they are diseases of children. Chronic disease is practically not represented in the list. In view of the sources of such reported data,

many mild cases will be missed, and this effect is of course not equal with respect to the different causes.

In judging the importance of a disease, it is necessary to consider the fatality as well as the incidence. In figure 4, accordingly, a composite picture is furnished in regard to case fatality. Because of the limitations of the material on which it is based, it is subject to many difficulties, but does add an interesting approach to the subject.

Shortcomings with respect to reports of notifiable diseases have led to the development of survey methods of ascertaining more accurately the prevalence or incidence of sickness in the population. Without attempting to survey this field from the time of the Metropolitan Life Insurance Co. canvasses, or the Public Health Service Hagerstown study, down to the present time, it seems adequate to

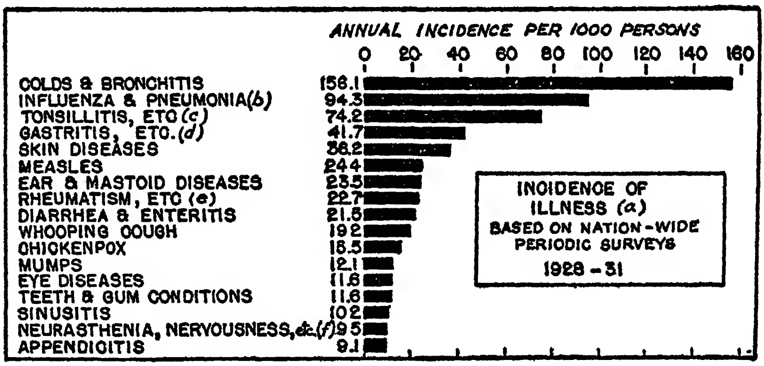

FIGURE 5.

deal with one investigation of this type, that made by the Committee on the Costs of Medical Care. Periodic canvasses (about every 3 months) were made for a year in 9,000 families in 18 States. The method followed that of the Hagerstown study [4] (the inspiration derived from which it would be difficult to exaggerate) and the results are generally consistent with that study. The procedure must be kept in mind in evaluating the data (which are shown in fig. 5). For details of this procedure reference must be made to the sources (and also to the reports of the Hagerstown study). The data give the annual incidence of sickness per 1,000 persons.

Visited at intervals of 3 months, the housewife forgets the minor conditions. Whereas, in this graph, minor respiratory diseases total to a rate of about 300 per 1,000 persons per year, studies designed to obtain information about all minor cases reveal rates 10 times as

[4] Hagerstown morbidity studies. A study of illness in a typical population group. By Edgar Sydenstricker. Reprints nos 1113, 1116, 1134, 1163, 1167, 1172, 1225, 1227, 1229, 1294, 1303, and 1312 from the Public Health Reports, 1926–29.

high,[5] and similar tendencies might be expected in the case of some other causes (for instance, indigestion) if the data were available.

This type of data relates to incidence of sickness, not prevalence of chronic diseases (which will be discussed later).

Another source of records of sickness is that of reports of sick-benefit associations in industry (fig. 6). Since such reports usually cover disabling illness lasting 8 days or longer, the severity of the conditions reported will be much greater than in the case of data obtained by periodic visits to the home and the incidence very much less.

Admissions to hospitals form another method of evaluating the importance of particular diseases in the general population. Data of this character are available from many sources, and it seemed sufficient for the present purpose to confine our attention to one type—that relating to the marine hospitals of the United States Public

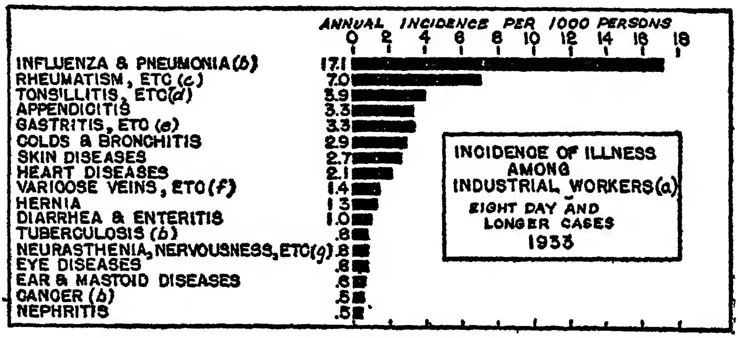

FIGURE 6.

Health Service (see fig. 7). The persons treated are beneficiaries of the Public Health Service, principally merchant seamen. It should be borne in mind that treatment is given to these persons without charge.

Some estimate of the severity of illness in the general population is available by considering the number of days lost (sick, disabled, in bed, etc.). For the present purpose the measure of severity has been taken as the number of days in bed, and in figure 8 the data obtained by the committee on the costs of medical care have been given from this point of view. The different approach is obvious, and needs no special comment, except to observe that we are still dealing with disease as manifested in observable illness.

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[5] The following may be quoted from a report of such a study by the Public Health Service: "The student rate of 3,333 respiratory cases per 1,000 approximates closely rates found for 3 consecutive years (3,340, 3,300, and 2,980 per 1,000) by Doull, Herman, and Gafafer for Johns Hopkins medical students. The respiratory rate for 2 consecutive years (3,175 and 3,072 per 1,000) found by Van Volkenburgh and Frost for a group of Baltimore families kept under close observation approximates the student rate in this study (3,333 per 1,000) much more closely than the family rate (1,831 per 1,000)." Selwyn D. Collins and Mary Gover: Incidence and clinical symptoms of minor respiratory attacks with special reference to variation with age, sex, and season. Reprint no. 1594 from the Public Health Reports, Sept. 23, 1933.

CHRONIC DISEASE

The prevalence of disease (i. e., the proportion of the population affected at any particular time) is to be distinguished sharply from the incidence of illness (i. e., the number of cases occurring during a

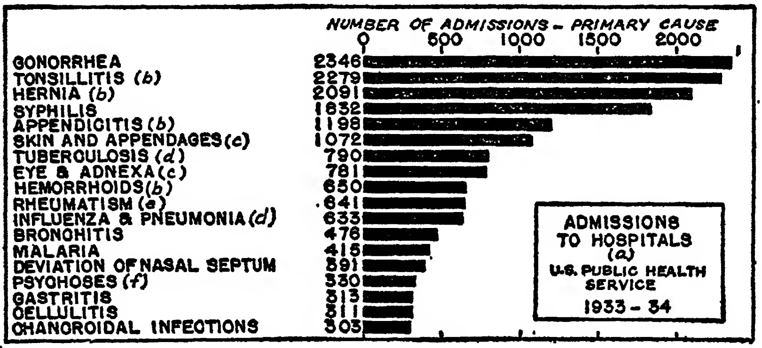

FIGURE 7.

specified period). Chronic conditions, lasting over a period of years, may be very important with respect to the ill-health of a population, but not show up in any great number in a study of cases of illness, because overshadowed by acute, frequently occurring conditions. A

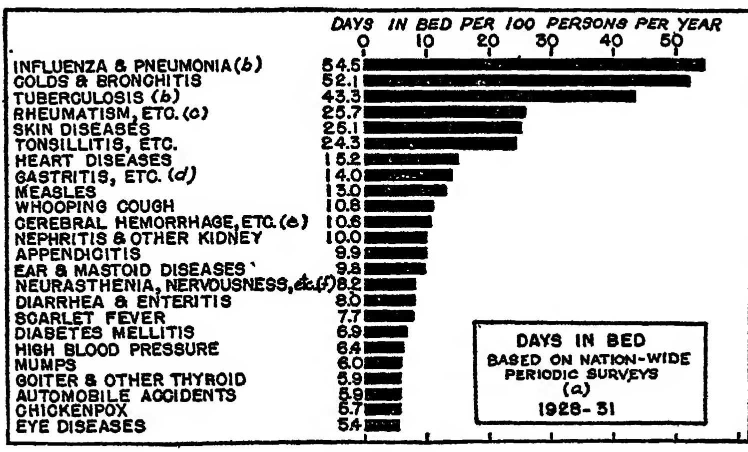

FIGURE 8.

special survey in Massachusetts made to determine the proportion of persons suffering from chronic disease, has been utilized in figure 9 to give an approximation of the importance of different chronic diseases in the general population.

The source just quoted with respect to chronic disease deals with the general population, but includes an estimate of hospitalized and institutionalized cases of cancer, pulmonary tuberculosis and mental

disease since hospitalized cases of these diseases are obviously understated to enumerators. It has seemed well to include also some special data on institutionalized cases. This is done in figure 10 for New York State. As the references show, the material is combined

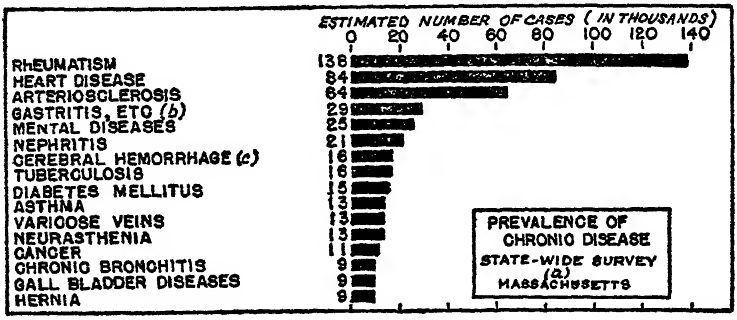

FIGURE 9.

from several sources. The overwhelming importance of mental disease is evident.

A further source of information is available from records of medical examinations of the general population. Such records offer an almost insuperable difficulty in differentiating between serious and minor impairments. To overcome this problem in the present instance, two methods were employed. In the first place, a chart was prepared to show the type of impairments found on medical examination which

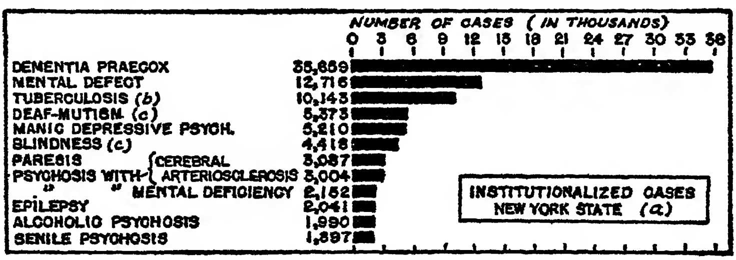

FIGURE 10.

are later associated with heavy rates of mortality (fig. 11). In the second place, an attempt was made to limit the conditions to those of a relatively severe degree by a mathematical calculation. (See references to charts.) The data utilized to show the relative prevalence of impairments noted on medical examinations are based on the adult population (fig. 12) and on the pre-school child (fig. 13).

AGE

Some of the previous material, especially that bearing on mortality and chronic disease, is weighted heavily by the older part of the popu-

lation. In figure 14 the mortality rates by cause have been given for the age group 20–24 years, a period of life when the economic value of a person might be thought to be greatest (the substitution of other age groups for a similar period of life would not affect the relative

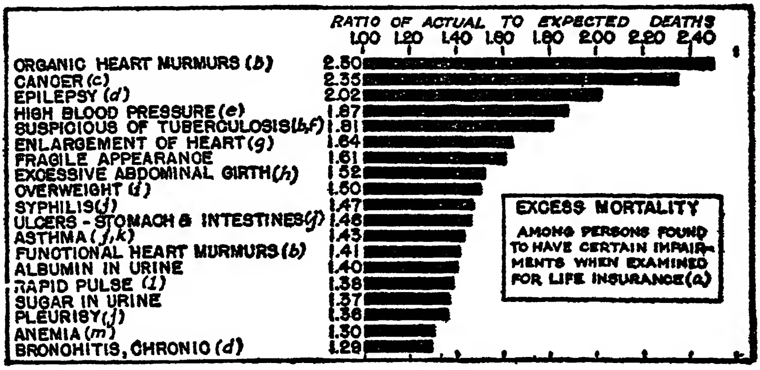

FIGURE 11.

position of different causes of death). It is extremely significant that, for a population of young adults, tuberculosis remains the most important cause of death.

A similar adjustment could be made for the previously given rates of illness based on the survey by the Committee on the Costs of Medical

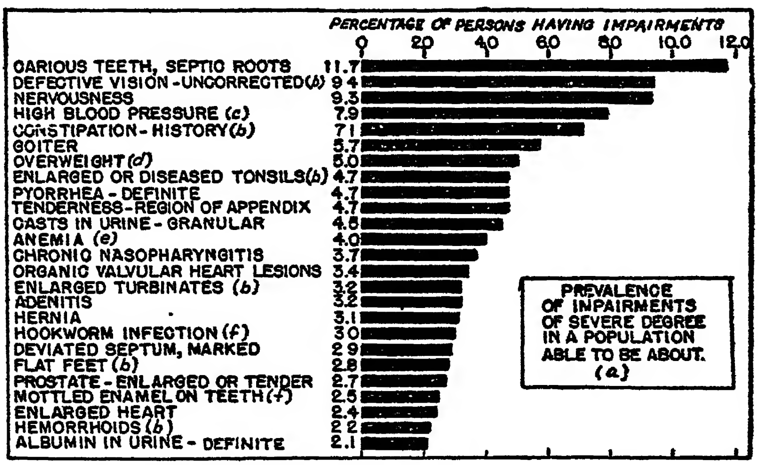

FIGURE 12.

Care, but in the case of sickness the only striking changes brought about by the adjustment would be the dropping out of the diseases of childhood. It may be said that the following conditions tend to show their highest peak in young adult life: Puerperal and female genital, automobile accidents, sinusitis, headache, backache, hemor-

rhoids, appendicitis, respiratory tuberculosis, furuncle, pleurisy, malaria, eye accidents, tumors of ovaries and uterus, quinsy, Vincent's angina, epilepsy, calculi of urinary passages.

TREND

Conditions which are increasing in frequency naturally merit special attention. No data are available to cover this point outside

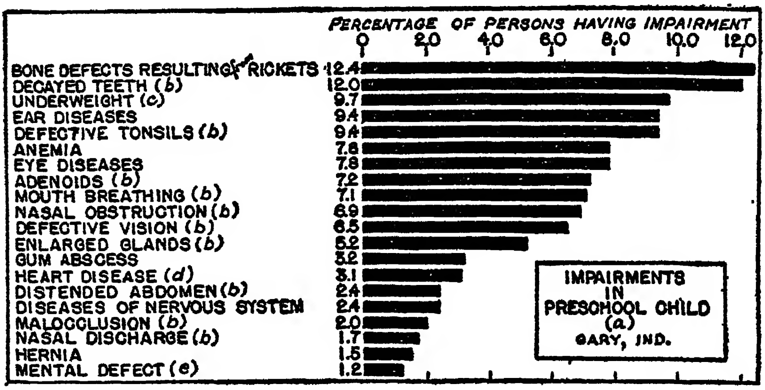

FIGURE 13.

of mortality, which is not a very satisfactory index because of changes in the rate of fatality of diseases. However, it seems worth while to indicate those causes of death that appear to be increasing. Since any study over a long period of time would involve changes in classifica-

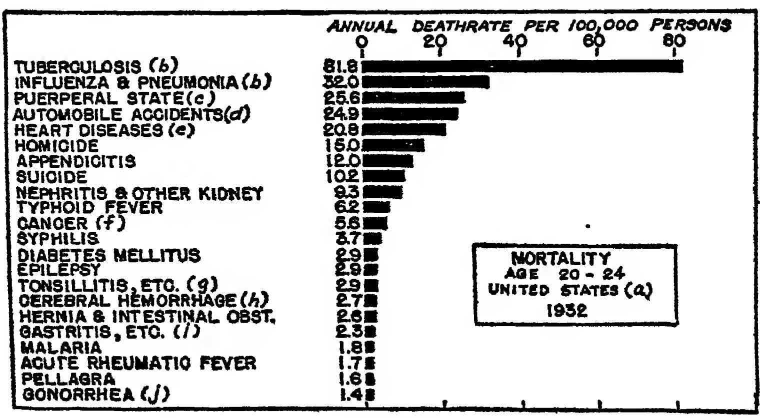

FIGURE 14.

tion or different attitudes on the part of physicians, the comparison has been limited to two periods, 1920–26 and 1927–33. Figure 15 gives the annual percentage increase for specific causes of death

showing a rise during this period. No correction has been made for age, but that is not an important factor over a 7-year period.

RELATIVE COST OF DISEASES

The primary reason why sickness results in insecurity of the population is economic. The survey by the Committee on the Costs of

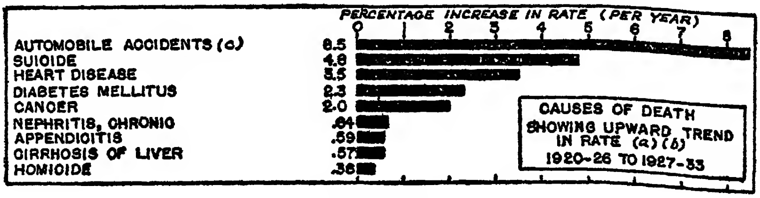

FIGURE 15.

Medical Care gives fairly adequate data on this point. Although conditions have changed since the survey was made, the relative position of different causes of sickness has probably not been affected to any great extent. Therefore, in figure 16 is given the percentage of the total charges for medical care which went for specific causes of sickness. (Care of teeth, confinements, and some other conditions were omitted as not being directly the result of disease.) A disease

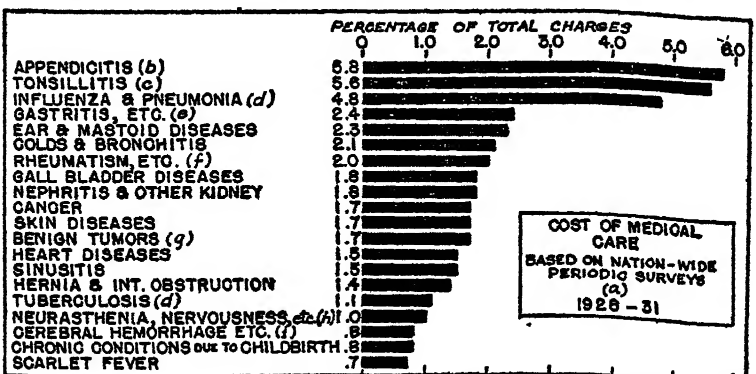

FIGURE 16.

may be important because the total cost is great, or it may be important because the cost of the individual case is great and therefore likely to have a serious effect on the security of the family. In figure 17 the conditions are listed in accordance with the average cost per case.

Associated with this question of cost is the prevalence of disease in those groups of the population least able to meet the cost. The general excess of sickness and mortality in the low economic groups is recognized. In figure 18 are listed the major causes of mortality

showing an excess in the underprivileged (unskilled workers has been used as the index). It may be stated that "all other" is high in this list, showing that many individual causes of death would rank with

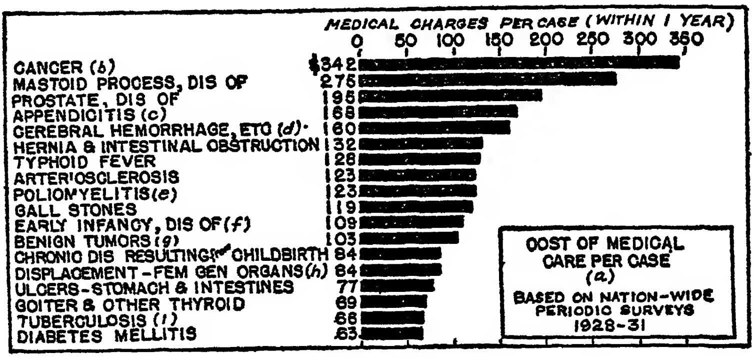

FIGURE 17.

the major conditions given in the table if data on them were available separately.

OTHER POINTS

The approaches considered have failed to throw light on one important aspect of public health—the protection of the worker against diseases arising out of his occupation. No adequate data are yet available to represent this approach; for this reason figure 19 simply lists the number of references in the literature (1931–34)

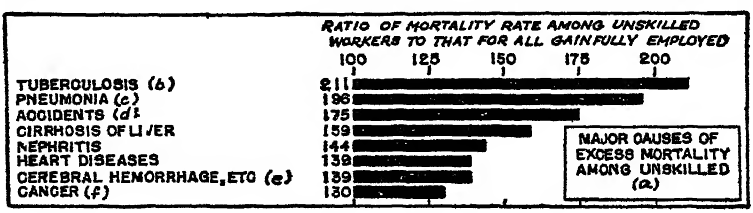

FIGURE 18.

relating to specific occupational diseases. The method is not very satisfactory, but does bring out the importance of certain conditions which would not otherwise be touched upon in this review.

A statement made earlier in the paper must be repeated at this point. Many conditions of grave importance are not of such a character as to be revealed by standard methods of approach. Their importance, however, might be shown by special surveys. The reader must supplement the ground covered in this review by his knowledge of the results of such special surveys and by an understanding of the potential hazards involved in specific public-health problems.

A COMPOSITE PICTURE

To bring together the various approaches into a more or less unified whole, two procedures have been followed: (*a*) The conditions have been assigned a rank in each graph (one for the highest, two for the next, etc.), the ranks being indicated in the index table at the end of the article; (*b*) a composite ranking of diseases and conditions has been attempted in order to establish the relative magnitude of particular conditions, considering all of the different points of view. The most important diseases are placed in the first magnitude. In general, it may be said that the magnitude is based on the rank of a condition in that chart in which it has its highest rank (and thus we may presume that its importance is most adequately represented).

To adjust for the difference in importance of the various charts, certain factors have been added,[6] so that a condition may not be in the first magnitude, even if at the top of a particular chart. For

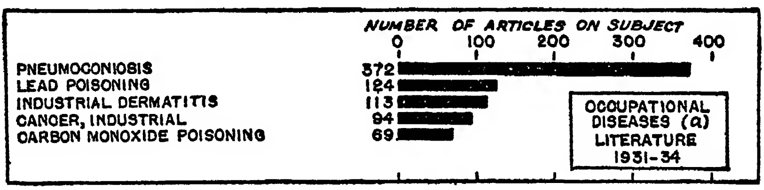

FIGURE 19.

instance, "colds and bronchitis" appears as the most important cause of illness in the general population group. However, the factor 3 has been added to the rank numbers for all items in that chart; thus "colds and bronchitis" is estimated as having a magnitude of 4.

The accompanying table indicates the magnitude assigned to each condition on the above basis, separating them according to groups. The position of any disease may be questionable; but the reader is in a position, on the basis of the foregoing information, to make any reclassification he deems more reasonable. A first approximation, drawing together all of the possible approaches, has seemed desirable in spite of its obvious limitations.

In summary, the outstanding diseases appear to be: (1) Influenza and pneumonia, tuberculosis, heart disease; (2) cancer, rheumatism, dementia praecox; (3) syphilis, appendicitis, mental defect, results of childbirth; and so on down the list.

[6] The factors are:

0: Figs. 1, 2, 14.
1: Figs. 9, 10.
2: Fig. 16.
3: Figs. 3, 8.
4: Fig. 7.
5: Figs. 4, 5, 6.
6: Figs. 15, 17.
7: Figs. 18, 19.
8: Fig. 11.
9: Figs. 12, 13.

Relative magnitude of conditions

Magnitude	A Respiratory	B Other contact	C Other infectious	D Degenerative	E Digestive, etc.	F Nervous and special senses	G Miscellaneous
1	Influenza and pneumonia. Tuberculosis.			Heart diseases.			
2				Cancer. Rheumatism.		Dementia praecox.	
3		Syphilis.			Appendicitis.	Mental defect.	Results of childbirth.
4	Tonsillitis.	Diphtheria. Measles.		Arteriosclerosis. Nephritis.			Automobile accidents.
5	Colds and bronchitis.	Gonorrhea.	Malaria.		Gastritis.	Cerebral hemorrhage. Deaf-mutism.	
6		Whooping cough.	Rabies.			Manic-depressive psychosis.	Homicide.
7		Scarlet fever.	Tetanus. Typhoid fever.		Hernia.	Blindness. Ear and mastoid.	Diseases of early infancy.
8	Pneumoconiosis.	Meningococcus meningitis.	Dysentery.			Paresis.	Skin diseases. Suicide.
9		Encephalitis.		Prostate.	Diabetes mellitus.	Psychoses with cerebral arteriosclerosis.	Lead poisoning.
10			Puerperal septicemia.		Carious teeth. Diarrhea/and enteritis. Gall bladder. Rickets.		Industrial dermatitis
11	Asthma and hay fever.	Poliomyelitis.	Acute rheumatic fever.		Cirrhosis of liver.	Epilepsy. Defective vision (uncorrected).	Industrial cancer.
12				High blood pressure. Varicose veins.		Alcoholic psychosis. Eye diseases. Neurasthenia.	CO poisoning. Underweight.
13		Erysipelas.			Hemorrhoids. Pellagra.	Senile psychosis.	

14	Tonsils—enlarged or diseased.	Smallpox.	Amoebic dysentery.		Constipation.		Benign tumors.
15	Chronic bronchitis.				Anemia.		Goiter.
16	Septic sore throat. Sinusitis.	Chicken pox.			Gallstones. Overweight.		
17	Enlarged adenoids.	Mumps.					
18-19	Deviated septum.		Septicemia (nonpuerperal).		Pyorrhea. Ulcers of stomach and intestines.		
20-21			Mycoses. Typhus fever.	Granular casts.			Adenitis. Cellulitis Displacement of female genital organs.
22-23	Chronic nasopharyngitis.	Chancroidal infection.	Undulant fever.	Albumin in urine. Rapid pulse.	Gum abscess.		
24-25	Enlarged turbinates. Pleurisy.			Sugar in urine.			
26-27			Hookworm.		Malocclusion.		
28-29							Flat feet.
30-31					Mottled enamel.		

Index to rank of condition in specified graph (figure number)

	Rank in specified graph																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Abdomen, distended													17						
Abdominal girth, excessive											8								
Accidents																		3	
Accidents, automobile	8							22						4	1				
Adenitis												16	12						
Adenoids													8						
Albumin in urine											14	25							
Alcoholic psychosis										11									
Amebic dysentery			17	8															
Anemia											18	12	6						
Appearance, fragile											7								
Appendicitis	15				17	4	5	13						7	7	1	4		
Appendix, tenderness region of												10							
Arteriosclerosis	11								3								8		
Asthma and hay fever									10		12								
Automobile accidents	8							22						4	1				
Blindness										6									
Blood pressure, high								19			4	4							
Bone defects due to rickets													1						
Bronchitis and colds					1	6	12	2								6			
Bronchitis, chronic									14		19								
Cancer	2					16			13		2			11	5	10	1	8	
Cancer, industrial																			4
Carbon monoxide poisoning																			5
Carious teeth, septic roots												1	2						
Casts, granular												11							
Cellulitis							17												
Cerebral arteriosclerosis, psychosis with										8									
Cerebral hemorrhage	5							11	7					16		18	5	7	
Cl[illegible]dal infections							15												
Chicken pox					11			25											
Childbirth, deaths and chronic conditions from and puerperal state	14													3		16	13		
Cirrhosis of liver	16														8			4	
Colds and bronchitis					1	6	12	2								6			
Congenital malformations and diseases of early infancy	7																11		
Constipation, history of												5							

Index to rank of condition in specified graph (figure number)—Continued

	Rank in specified graph																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Deaf-mutism										4								
Decayed teeth, septic roots												1	2					
Dementia praecox										1								
Dermatitis, industrial																		
Diabetes mellitis	9							18	9					13	4		18	
Diarrhea and enteritis	10				9	11		16										
Diphtheria	23	4	9	10														
Displacement—female genital organs																	14	
Dysentery		8																
Dysentery, amoebic			17	9														
Ear and mastoid diseases					7	15		14					4			5		
Early infancy, diseases of and congenital malformations	7																11	
Encephalitis		15	15	4														
Enteritis and diarrhea	10				9	11		16										
Epilepsy										10	3			14				
Erysipelas		13		8														
Eye diseases					13	14	8	21					7					
Flat feet												20						
Fragile appearance											7							
Gall bladder diseases	20								15							8		
Gall stones																	10	
Gastritis, etc	17				4	5	16	8	4					18		4		
General paralysis of insane										7								
Genital organs, displacement—female																	14	
Girth, abdominal, excessive											8							
Goiter and other thyroid								21				6					16	
Gonorrhea		17	6				1							22				
Granular casts												11						
Gum abscess													13					
Gum and teeth conditions					14													
Hay fever and asthma									10		12							
Heart diseases	1					8		7	2				14	5	3	13		6
Heart, enlarged											6	23						
Heart, functional murmur											13							
Heart, organic valvular lesions											1	14						
Hemorrhoids							9					24						

Index to rank of condition in specified graph (figure number)—Continued

	Rank in specified graph																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Hernia and intestinal obstruction	15					16	3		16			17	19	17		15	6		
Homicide	16													6	9				
Hookworm infection												18							
Hypertrophic rhinitis												15							
Industrial cancer																			4
Industrial dermatitis																			3
Infancy, early, diseases of and congenital malformations	7																11		
Infantile paralysis		19	14	6													9		
Influenza and pneumonia	3	1	2		2	1	11	1						2		3			
Insanity (See psychoses)																			
Lead poisoning																			2
Liver, cirrhosis of	19														8			4	
Malaria	25	5	7				13							19					
Malformations, congenital and diseases of early infancy	7																11		
Mononucleosis													17						
Manic depressive psychosis										5									
Mastoid, and ear diseases					7	15		11					4			5			
Mastoid process, diseases of																	2		
Measles		9	1	14	6			9											
Meningitis, meningococcic		14	16	3															
Mental defect										2			20						
Mental deficiency, psychosis with										9									
Mental diseases							15		5										
Mottled enamel on teeth												22							
Mouth breathing													9						
Mumps					12			20											
Mutism, deaf-										4									
Mycoses		20																	
Nasal obstruction													10						
Nasopharyngitis, chronic												13	18						
Nephritis and other kidney	4					17		12	6					9	6	9		5	
Nervousness, neurasthenia					16	13		15	12			3	16			17			
Overweight											9	7							
Paralysis, general, of insane										7									
Paralysis, post poliomyelitis		19	14	6													9		
Paralysis, unspecified	5							11	7					16		18	5	7	

Index to rank of condition in specified graph (figure number)—Continued

	Rank in specified graph																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Paresis										7									
Pellagra			13											21					
Pleurisy											17								
Pneumoconiosis																			1
Pneumonia				5														2	
Pneumonia and influenza	3	1	2		2	1	11	1						2		3			
Poliomyelitis		19	14	6													9		
Prostate, diseases of	21											21					[illegible]		
Psychosis, alcoholic										11									
Psychosis with cerebral arteriosclerosis										8									
Psychosis, manic depressive										5									
Psychosis, with mental deficiency										9									
Psychoses (mental disease)							15		5										
Psychosis, senile										12									
Puerperal septicemia		10																	
Puerperal state (deaths and chronic conditions)	14													3		19	13		
Pulse, rapid											15								
Pyorrhea												9							
Rabies		23		1															
Rheumatic fever, acute		11												20					
Rheumatism, etc					8	2	10	4	1							7			
Rickets, bone defects due to													1						
Scarlet fever		12	4	13				[illegible]								20			
Septic sore throat			13																
Septicemia, nonpuerperal		[illegible]																	
Septicemia, puerperal	14																		
Septum, deviated							11					1							
Sinusitis					15											14			
Skin diseases					3	[illegible]	6	5								11			
Skin, industrial dermatitis																			3
Smallpox			11	11															
Sore throat, septic			13																
Stomach, gastritis, etc	17				4	3	16	8	4					[illegible]		4			
Stomach and intestines, ulcers of											11						15		
Sugar in urine											16								
Suicide	12													8	2				
Syphilis	13	8	3				4				10			12					

Index to rank of condition in specified graph (figure number)—Continued

	Rank in specified graph																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Teeth and gum conditions					14													
Teeth, carious, septic roots												1	2					
Tetanus		16		2														
Thyroid diseases								21				6					16	
Tonsillitis, etc	24				3	3	2	6						15		2		
Tonsils, enlarged or diseased												8	5					
Tuberculosis	6	2	8			12	7	3	8	3	5			1		16	17	1
Turbinates, enlarged												15						
Tumors, benign	22															12	12	
Typhoid fever		7	12	7										10			7	
Typhus fever		21																
Ulcers of stomach and intestines											11						15	
Underweight													3					
Undulant fever		22																
Varicose veins						9			11									
Vision, defective—uncorrected												2	11					
Whooping cough		6	5	12	10			10										

Appendix

Explanatory references to the graphs

FIGURE 1

(a) From news release, United States Census Bureau, October 9, 1934. Primary causes. Whole country (all colors, both sexes, all ages).
(b) Includes diseases of coronary arteries.
(c) All forms.
(d) Includes cerebral embolism, thrombosis, hemiplegia.
(e) Diseases of early infancy and congenital malformations.
(f) Includes deaths resulting from collision with railroad trains and street cars.
(g) Exclusive of coronary arteries.
(h) Diseases of pregnancy, childbirth, and the puerperal state
(i) Includes other diseases of stomach, exclusive of cancer.
(j) Includes other liver diseases.
(k) Includes unspecified.
(l) Diseases of pharynx and tonsils.

FIGURE 2

(a) From news release, United States Census Bureau, October 9, 1934. Primary causes. Whole country (all colors, both sexes, all ages).
(b) All forms.
(c) Term used in report is lethargic encephalitis.
(d) Acute.

FIGURE 3

(a) The Notifiable Diseases: Prevalence in States, 1933. Supplement No. 112 to Public Health Reports.
(b) These diseases are not reportable in many States. The rate is based on the States in which they are reportable.

(c) Estimated on basis of separate reports to Division of Venereal Diseases, United States Public Health Service.

(d) All forms.

(e) As the 1933 rate seemed abnormally low, the median 1923-32 was used instead for this disease.

FIGURE 4

(a) Corrected fatality rates in public-health practice. By Howard W. Green and George W. Moorehouse. Reprint No. 1354 from the Public Health Reports, January 24, 1930. (For all diseases in the graph with the exception of rabies, encephalitis, and amoebic dysentery.) Figure for rabies is based on the knowledge that no cases recover. Figures for encephalitis and amoebic dysentery are based on reports to the Public Health Service.

(b) All forms.

FIGURE 5

(a) Causes of illness in 9,000 families based on Nation-wide periodic canvasses, 1928-31. By Selwyn D. Collins. Reprint No. 1563 from the Public Health Reports, March 24, 1933.

(b) All forms.

(c) Includes laryngitis and throat illnesses; tonsillectomies.

(d) Gastritis, indigestion, and other stomach conditions, ulcers of stomach and intestines.

(e) Includes arthritis, neuralgia, neuritis, etc.

(f) Includes nervous exhaustion.

FIGURE 6

(a) Incidence of illness among male industrial employees in 1933 as compared with earlier years. By Dean K. Brundage. Public Health Reports, May 25, 1934. (Covers 152,203 male members of 38 sick-benefit associations.)

(b) All forms.

(c) Includes arthritis, neuralgia, neuritis, and sciatica.

(d) Diseases of the pharynx and tonsils.

(e) Diseases of the stomach (exclusive of cancer).

(f) Diseases of the veins.

(g) Neurasthenia and the like.

FIGURE 7

(a) Annual Report of the Surgeon General of the Public Health Service of the United States for the fiscal year 1934, page 104. Diagnostic groups were omitted where a large percentage of the cases appeared to result from injury. Classified according to major conditions for which admitted.

(b) Primarily operations.

(c) Diseases and injuries of.

(d) All forms.

(e) Arthritis.

(f) Psychiatric diseases.

FIGURE 8

(a) Based on unpublished material collected by the Committee on Costs of Medical Care. Surveys cover a period of 12 consecutive months, 1928-31. Excludes institutionalized cases. Cases of unknown number of days in bed allocated on basis of average for known duration. Figures include sole and primary diagnosis.

(b) All forms.

(c) Includes arthritis, neuralgia, neuritis, sciatica, lumbago, etc.

(d) Common disturbances of digestive tract; ulcers of stomach.

(e) Includes paralysis without specified cause.

(f) Includes nervous exhaustion.

FIGURE 9

(a) Cancer and other chronic diseases in Massachusetts. By Geo. H. Bigelow and Herbert L. Lombard. Houghton Mifflin, Boston, 1933. Based on appendix table 26, giving estimated volume of chronic disease in Massachusetts, 1929-31.

(b) Digestive diseases.

(c) Apoplexy.

FIGURE 10

(a) Forty-fifth annual report of the Department of Mental Hygiene, July 1, 1932 to June 30, 1933. State of New York Legislative Document (1934), No. 29. Number in institutions on June 30, 1933. For specific diagnoses of psychoses, the number of cases on June 30, 1933, was available only for the civil State hospitals. Consequently a correction was made on the basis of the total number of patients with various diagnoses under treatment during the year in civil State hospitals and the total number in all mental institutions conducted or inspected by the department of mental hygiene.

(b) Average number of patients in tuberculosis hospitals in New York State during 1934. From Hospital Number, Journal of American Medical Association, March 30, 1935.

(c) From Statistical Abstracts of the United States, 1934. United States Bureau of Foreign and Domestic Commerce. Number enumerated April 1, 1930.

FIGURE 11

(a) The physical impairments of adult life: Association with subsequent rates of mortality. Studies in the diseases of adult life no. 9. By Rollo H. Britten. Journal Preventive Medicine, vol. 6, no. 4, p. 249, July 1932. Based on medical impairment study, compiled and published by the Joint Committee on Mortality of the Association of Life Insurance Medical Directors and the Actuarial Society of America, 1929. The ratios are of actual and expected mortality among persons found to have specific impairments at the time of their applicant examination for life insurance (or giving a history of such impairments). In calculating these ratios, the age and the number of years of policy life were taken into account.

(b) Substandard policies (i. e., for persons paying a higher premium because of serious physical impairment).

(c) History of operation.

(d) History or found on examination.

(e) Five mm or more above average for age. If a more severe standard had been set, the ratio would have been much greater.

(f) Lungs unsatisfactory, dullness, prolonged expiration, or suspicious apices.

(g) Without murmur.

(h) Abdominal circumference markedly greater than expanded chest (0-29 percent over average weight for height and age).

(i) Fifty pounds or more over average weight for height and age (men). The ratio is estimated from a supplementary study by the joint committee (supplement to impairment study, 1929).

(j) History.

(k) Does not include hay fever.

(l) One hundred or more beats per minute.

(m) Hemoglobin, 60 to 80 percent.

FIGURE 12

(a) The physical impairments of adult life. General results of a statistical study of medical examinations by the Life Extension Institute of 100,924 white male life-insurance policyholders since 1921. Studies in diseases of adult life no. 1. By Edgar Sydenstricker and Rollo H. Britten. American Journal of Hygiene, volume 11, no. 1, page 73, January 1930.

Sex differences in the physical impairments of adult life. A comparison of rates among men and women, based on 112,618 medical examinations by the Life Extension Institute. Studies in diseases of adult life no. 7. By Rollo H. Britten. American Journal of Hygiene, volume 13, no. 3, page 741, May 1931.

The figures are averages of the rates for men and women for all ages (adults), exclusive of examinations made in the head offices. Data for certain impairments were based on special tabulations not included in these reports; these are indicated in footnotes.

(b) Because of the fact that slight degrees of certain types of impairments are likely to be noted on physical examination, a correction was made. This correction was based on the fact that, in the case of certain impairments for which the degree was specified, the ratio of marked to total averaged about 0.18. The prevalence rate for the impairments carrying note (b) were multiplied by 0.18 to make them more comparable with the other conditions.

(c) Twenty mm and more above average for age. Average for ages 30-39 and 45-64. (From special tabulation.)

(d) Twenty-five percent and more over the average weight for height (estimated from special tabulation).

(e) Below 70 percent hemoglobin (estimated from special examinations).

(f) Based on estimated number of persons (from other sources).

FIGURE 13

(a) Physical status of preschool children, Gary, Ind. By Anna E. Rude. United States Children's Bureau Publication No. 111. 1922.

(b) Because of the fact that slight degrees of certain types of impairments are likely to be noted on physical examination, a correction was made. This correction was based on the fact that in the case of certain impairments for which the degree was specified on special examination (see footnote (b) under fig. 12), the ratio of marked to total averaged about 0.18. The prevalence rates for the impairments carrying footnote (b) were multiplied by 0.18 to make them more comparable with the other conditions.

(c) Ten percent or more below the average for height and age.

(d) Including "questionable."

(e) Apparent or suspected.

FIGURE 14

(*a*) Mortality Statistics 1932. United States Bureau of the Census. (All colors, both sexes.)
(*b*) All forms.
(*c*) Diseases of pregnancy, childbirth, and the puerperal state.
(*d*) Includes deaths resulting from collision with railroad trains and streetcars.
(*e*) Includes diseases of coronary arteries.
(*f*) Includes other malignant tumors.
(*g*) Includes pharyngitis, laryngitis, and similar causes.
(*h*) Includes cerebral embolism, thrombosis, and hemiplegia.
(*i*) Includes other diseases of stomach except cancer.
(*j*) Includes other venereal diseases (except syphilis).

FIGURE 15

(*a*) From news release of Bureau of Census, covering mortality by cause in registration States of 1920 Median rates for two periods are contrasted—1924–26 and 1927–33.
(*b*) The greatest percentage increase was actually shown for epidemic cerebrospinal meningitis; but since the mortality for the years immediately prior to 1920 (utilizing data for registration States of 1910) was greater than for the years 1927–33, it has been omitted from the graph.
(*c*) Includes collision with railroad trains and streetcars.

FIGURE 16

(*a*) The incidence of illness and the receipt and costs of medical care among representative families. Experiences in 12 consecutive months during 1928–31. By I. S. Falk, Margaret C. Klem, and Nathan Sinai. Publication of the Committee on the Costs of Medical Care No. 26. University of Chicago Press, Chicago, 1933. (Excludes institutional care, confinements, etc., care of the teeth, and care of eyes.)
(*b*) Includes appendectomy.
(*c*) Includes tonsillectomy, pharyngitis, and laryngitis.
(*d*) All forms.
(*e*) Common disturbances of the digestive tract; includes ulcers of the stomach and intestines.
(*f*) Includes arthritis, neuralgia, neuritis, sciatica, lumbago, etc.
(*g*) Includes tumors and cysts of female genital organs.
(*h*) Includes nervous exhaustion.
(*i*) Includes paralysis without specified causes.

(*a*) The incidence of illness and the receipt and costs of medical care among representative families. Experiences in 12 consecutive months during 1928–31. By I. S. Falk, Margaret C. Klem, and Nathan Sinai. Publication of the Committee on the Costs of Medical Care No. 26. University of Chicago Press, Chicago, 1933. (Excludes institutional care, confinements, etc , care of teeth and care of eyes.)
(*b*) Includes other malignant tumors.
(*c*) Includes appendectomy.
(*d*) Includes paralysis without specified cause.
(*e*) Includes paralysis resulting from poliomyelitis.
(*f*) Includes premature birth, injury at birth, and congenital debility.
(*g*) Includes tumors and cysts of female genital organs.
(*h*) Includes leucorrhea.
(*i*) All forms.

FIGURE 18

(*a*) Mortality rates by occupational class in the United States. By Rollo H. Britten. Reprint No. 1648 from the Public Health Reports, Sept. 21, 1934. The data are for 10 States. (Original source is "Death rates by occupation, based on data of the United States Census Bureau, 1930." Edited by Jessamine S. Whitney. Published by the National Tuberculosis Association.) The 10 States are Alabama, Connecticut, Illinois, Kansas, Massachusetts, Minnesota, New Jersey, New York, Ohio, and Wisconsin. The ratios are based on rates adjusted for age. All other causes has a ratio of 165.
(*b*) Respiratory system.
(*c*) All forms.
(*d*) Includes traumatism by fall, absorption of poisonous gas, and burns (conflagration excepted).
(*e*) Includes softening of the brain.
(*f*) Includes other malignant tumors.

FIGURE 19

(*a*) Number of articles published and abstracted in Journal of Industrial Hygiene from 1931 to 1934 inclusive, were tabulated according to the occupational disease under discussion.

MALARIA-CONTROL ACTIVITIES OF THE TENNESSEE VALLEY AUTHORITY*

By E. L. Bishop, M. D., *Director of Health, Tennessee Valley Authority*

The regional planning which provides improvement of navigation, land reclamation, flood control, and power potentialities impinges upon malaria problems because of changes in conditions which modify shore-line characteristics and create quiet water. For this reason the Tennessee Valley Authority must carefully plan the measures essential for prevention of any mosquito production that would increase malaria transmission along its 2,300 miles of impounded reservoir shore line. These measures are being closely considered by every element of the enterprise. It is doubtful that any stream-development program has ever had better coordination of efforts for malaria prevention, and mention of a few of the relationships established through this planning should demonstrate the value of such an approach.

The design of the Wheeler Dam was changed at the very beginning of construction to provide such alteration in the height of the gates as would permit the seasonal and periodic fluctuation of water level essential to the maintenance of clean shore line and a minimum condition of mosquito (*Anopheles*) production. Since that time the design of each new dam provides a malaria surcharge which is agreed upon between the engineers and those of us responsible for malaria control.

In reservoir-clearance operations, surveys are made by our sanitary engineers before clearance begins and throughout this work a resident engineer detailed from the health section is on duty with the clearance forces. Thus the Authority, while fulfilling its obligation to aid navigation and control floods, is doing so in such a manner as also to facilitate the control of mosquito production. Marginal clearance is frequently of a modified type which leaves certain growths [1] standing, but clears all small growth and overhanging limbs. The operation as a whole is synchronized insofar as possible with the needs for mosquito control, and when this is not possible the areas are rebrushed wherever necessary.

The impoundage schedule is agreed upon in general conferences of all parts of the Authority that have a specific interest, and this includes the Health Section. No reservoirs will be filled during the mosquito-breeding season. While simple in statement, this part of planning is difficult and may well provide real complications in engineering services

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*Read before Florida Public Health Association Meeting, Orlando, Fla., Dec. 4, 1935.

[1] Such as willow, gum, and cypress.

Projects relating to the development of fish and game preserves clear through the planning council, upon which the health section is represented. In addition, a representative of the section serves on a joint committee with the Forestry Division in the preliminary discussions. Thus the optimum result in production of fish with the greatest effect upon the prevention of mosquito production is possible.

In studies carried out by the Project Planning Division to develop a schedule of operations to secure optimum results for flood control and navigation provision has been made for the water-level fluctuation essential to control of mosquito production. This also includes distribution of load between possible power developments so that reservoir levels can be alternately raised and lowered. The planning has therefore already extended into the operating stage and makes possible a synchronized operation to provide fluctuation for malaria control.

Preparation and plans by the Health Section have included studies of existing conditions, probable conditions after impoundage, studies of control procedures, and the beginning of some basic research. It may be sketched briefly as follows:

(1) In addition to the field-control forces and the resident engineers on the reservoirs, a malaria unit consisting of a malariologist, an engineer trained in impounded water-control procedures, an entomologist, and a limnologist has been organized at Wilson Dam and provided with essential laboratory and other facilities for its work. Administratively the work of this group clears through the medical officer in charge to an epidemiologist and senior sanitary engineer of the central office.

(2) Base-line surveys of the prevalence of infection and of the extent and kind of anopheline breeding have been made for each reservoir area where a dam is under construction. The first infection survey of an area has consisted essentially of blood smears taken from as nearly every fifth family as possible in order that not less than a 10-percent sample might be available for studies. In addition, each house of the area is plotted on maps prepared in accurate detail from airplane mosaics, and a household census is taken. *Anopheles* catching stations are established in such manner as to give a representative cross section of the area, and regular catches are made at each station throughout the breeding season.

The result is a well-mapped area and data showing the preimpoundage conditions with sufficient accuracy to guide the beginning of control operations. Subsequent surveys of infection will, of course, be made, though these will be of a different type and confined mainly to spleen and blood studies of school children: a course of procedure made possible by the accuracy of mapping and the detail with which population data are secured. In passing, it is interesting to note that

the fifth family survey (1934) of Wheeler Reservoir, which is made up of the basin proper and that area lying within 1 mile of the high level contour, showed 27.1 percent of all blood smears taken from the rural population positive for malaria, 19.6 percent showing *P. vivax*, and 67.4 percent *P. falciparum*. A recent survey (1935) of Pickwick Reservoir area shows a much lower total rate and an exceedingly low rate in the Miocene sand and gravel area of Mississippi and Tennessee. The principal infection is found in the limestone areas of north Alabama.

The area lying within 1 mile of the Lake Wilson shore line was also surveyed by the fifth family method, and the resulting sharp localization of our control problems demonstrated the usefulness of accurate knowledge regarding the distribution of infection. We are, therefore, sparing no effort to obtain similar knowledge concerning the pools yet to be impounded. Here the accuracy of the mapping operations will very probably permit the use of less costly survey methods.

(3) Studies for the development of more efficient means of applying larvicides, of more effective larvicides, and of natural factors influencing breeding conditions have been begun and are being extended in the hope that less costly control measures may be found, or that present methods can be modified with similar results. Attention is also directed to more efficient designing and operation of boats and power apparatus, and considerable work has been done in the study of airplane dusting of both the acreage and shore-line types. Accurate cost records have been kept, and a close check of the effectiveness of control has been maintained. Thirty-three miles of shore line on Lake Wilson and 120 acres of spring-fed natural swamp and lake area were set aside for this study. Costs on shore line dusting compared favorably with costs of other methods of application,[2] but this type of flying is quite dangerous and the effectiveness of control as yet inadequately demonstrated. Supplementary studies will be carried out next season. The results of acreage dusting were more encouraging. Reasonably adequate reductions in breeding were secured at costs comparing quite favorably with other methods of distribution[3] and use of this method in routine control procedure appears warranted. The experiment has been reported in detail by our staff at the recent meeting of the National Malaria Committee.[4]

In addition to this work, studies of the effect of dense shade on mosquito production are proceeding through the reservation of certain areas for experimental purposes. Here the smaller growths are

[2] $103.80 per season per mile for airplane distribution and $130.20 per season per mile for oiling by boat.

[3] $1.22 an acre for airplane dusting, as compared with $2.20 an acre for hand and boat dusting and $.282 for oiling.

[4] Observations on airplane dusting. By Dr. R. B. Watson.

removed and growths of gum and cypress left standing in water a few feet deep. Parallel studies of the possibilities of reforestation with these woods are going forward, some thousands of young trees having been planted. Shore-line improvements through diking, secondary dams, drainage, and similar measures is also claiming attention with a view of reducing to a minimum the area requiring larvicidal control, always a costly and relatively inefficient procedure.

(4) Studies more definitely research in character have been planned and some phases of these studies have been begun. For example, we need to know more concerning the strains of parasites causing infection; we should have more specific information concerning the habits and breeding conditions of *A. quadrimaculatus* in our region; clinical studies of malaria in our population may afford useful information; and a study of the biology of our reservoirs prior to, during, and after impoundage may well provide us with measures of practical value.

(5) The design and construction of equipment for control operations is instituted well in advance of the need. Estimates are now being prepared for the Wheeler Reservoir area, though impoundage here is not expected until the fall of 1936, and extensive control service therefore will not be required until the spring of 1937. Boats and power equipment for oiling and dusting are already available on Norris Lake, though this impoundage will not be completed until the winter and spring seasons of 1935 and 1936. The foreman for this area, already experienced in impounded-water work, was given additional training last summer and is now in reserve on forestry work.

With reference to actual control procedures organized for routine service, Lake Wilson has been the only basin where continuing activity has been in effect, since it is the only lake under the administration of the Authority where impoundage has been completed. Work here has had a double purpose: First, the adequate control of mosquito production, and, second, experimentation in an effort to develop effective and economical methods for the pools yet to be impounded. It was here we carried on the experiment in shore line dusting by airplane, and here also we proved that mosquito production could be controlled with a constant water elevation at the high level contour when the costs of additional measures were offset by economy elsewhere. Actually, the saving effected in dredging operations because of the constant level amounted to many times the extra costs for mosquito control. Lake Wilson has also been used as a training station for personnel being developed for supervisory responsibilities on other pools. Young engineers serve as inspectors on the experimental work, and the more promising individuals are transferred to control services after they have demonstrated ability.

Perhaps the most fundamental accomplishment yet achieved has been the coordination of our service with that of other agencies, in-

cluding State and local health departments, other Federal organizations, and private agencies. Present relationships indicate the extent of correlation and may be summarized as follows:

(1) A board of consultants has been formed which includes three officers of the United States Public Health Service, an entomologist from the Bureau of Entomology of the Department of Agriculture, and a malariologist of the Rockefeller Foundation. Each member represents essentially a particular aspect of malaria work, though all are broadly experienced in several or all aspects. To this board has been given the functions of expert consultation, critical review, and final appraisal in relation to our existing control services, and the planning of new services. Its findings are final. At least one full meeting is held each year, and individual members are called in consultation as frequently as new problems arise or modification of existing procedure becomes essential. The total time given by the members individually and collectively amounts to a very considerable figure, and the relationship is sufficiently definite and formal to be a determining factor in our plans and procedure. We are convinced that the correlation of the staff service with the mature judgment of broadly experienced experts will afford an interesting and exceedingly valuable example of group thinking and group judgment.

(2) State and local health departments have been brought into the whole health and sanitation program through the simple media of contracts for service and specific agreements concerning joint malaria control programs. The contracts for service extend certain financial consideration from the Authority through the State health agency to the local health department, provided certain service obligations are undertaken by those organizations. In this manner, coordination of procedure is secured, duplication is avoided, the health agencies are strengthened, and the control procedures fortified by the authority of the State and local governments. All regional planning within a particular State is of course, accomplished in cooperation with State agencies.

The second medium, agreement on program, is made specific through the preparation of written statements carrying all essential detail. The actual job of preparing the statement of plans and program is accomplished through joint conferences of the field staffs and approved by executive action only after complete agreement has been reached in the field. Under such arrangements a partnership of service becomes possible. Any other system would permit only separate action.

The advantages of the arrangement are very definite. A second line of defense against increased prevalence of malaria is at once available. Immediately this affords the opportunity for much broader control procedure, including such items as major and minor drainage

of areas contiguous to the pools, improvement of housing and mosquito-proofing services, the establishment of an intelligence service through improvement of morbidity reporting, extension of research studies, and an infinite variety of other activities of mutual interest.

When it is realized that more than 1,000 lime sink pounds exist around the 3 reservoirs in Alabama, Mississippi, and West Tennessee, that housing conditions in many instances are such as to preclude really adequate mosquito proofing, and that morbidity reporting as yet is but incompletely developed, the need for cooperative effort and joint service should be readily apparent.

(3) Cooperation in the training of personnel has been extended by the Rockefeller Foundation and by official agencies, through a fellowship grant from the former and through use of the malaria station facilities of both. In addition, the members of the board of consultants have given freely of their efforts in this part of our work.

(4) Health education is conceded an important place in malaria control by everyone who has faced the practical problems under the usual field conditions. This, too, is an important element of our cooperative arrangements, for a staff member of the health section has developed methods for use by the schools and health agencies which are apparently as useful as any yet developed in this region. The methods are being followed by the local school and health services of the area, and the result seems to be a community "malaria consciousness" heretofore unrealized.

SUMMARY

The unusual combination of facilities existing in the Tennessee Valley Authority and the point of view of this organization in regard to malaria, together with the extent to which the activity in malaria control has been and is being correlated with that of other agencies, has made possible what is thought to be a somewhat unusual development in planning an approach to control of the disease on a regional basis. Present objectives and aims may be briefly stated as defining the problem in relation to extent of infection and characteristics of the vector and infecting agent; the reaction upon the host; investigation of biological conditions which may influence transmission; surveys of environmental conditions and so changing these conditions as to decrease the need for larvicidal agents in controlling transmission. Many of the conditions will probably be related to shore-line improvement, county programs of drainage, better housing, mosquito proofing, and such health education as may stimulate an increasing public cooperation.

RAT-BITE FEVER SPIROCHETES IN NATURALLY INFECTED WHITE MICE, *MUS MUSCULUS*[1]

By EDWARD FRANCIS, *Medical Director, United States Public Health Service*

Dark-field examination of human material for rat-bite fever may fail to demonstrate the spirochetes, but when such material is injected into white mice, white rats, or guinea pigs, multiplication may render the organisms readily visible by dark-field examination of the animal's blood. The white mouse is the most susceptible experimental animal for this organism; but caution is necessary when using white mice, as the animals may be already naturally infected.

Robertson [2] has made the only reference which I have seen in the literature to natural infection of white mice. He states that, on four occasions since 1924, he has discovered spontaneous infection of rat-bite fever in laboratory mice which were either stock animals or were carrying some other parasite (*Trypanosoma cruzi* or *Treponema recurrentis*).

I had an experience similar to that of Robertson. On December 19, 1935, and again on December 20, a stock white mouse was allowed to ingest 2 dozen living bed bugs immediately after they had fed to engorgement on a mouse whose blood was rich in relapsing fever spirochetes. On December 21 his blood showed a heavy infection with rat-bite fever spirochetes, but he did not become positive for relapsing fever spirochetes until December 23. This suggested an examination of the remaining stock mice, of which there were only 8; 6 of these were found infected with rat-bite spirochetes by dark-field examination of the tail blood.

Subsequent examination was made of samples of each lot of fresh white mice as they were furnished to the National Institute of Health by four dealers. Tests indicated that three of the dealers were supplying mice free from this infection; but on April 14, 1936, of 150 white mice received from the fourth dealer, 45 were found infected with rat-bite spirochetes by dark-field examination of tail blood, and 105 were negative.

A single preparation was made from each mouse and about 10 minutes were devoted to its examination, using a high-dry objective, without funnel stop, and a dark-field substage condenser. The numbers of spirochetes per single preparation of 45 positive mice were 31, 30, 52, 14, 30, 6, 20, 40, 60, 15, 1, 3, 15, 21, 2, 60, 10, 25, 3, 26, 20, 10, 10, 8, 3, 30+, 27, 30+, 10, 9, 12+, 5, 11, 30+, 4, 29+, 13, 14, 11, 3, 28+, 21, 3, 25+, and 23.

Between April 14 and June 22, 1936, a second examination was made of the 105 mice which were negative on the first examination but

[1] From the National Institute of Health, Washington, D. C.

[2] Robertson, Andrew: Rat-bite fever. Ann. Trop Med. and Parasit., 24: 367 (1930).

which were kept together in one lot. Of these, 20 were found infected, the number of spirochetes per single dark-field preparation of 20 positive white mice being 5, 9, 19, 8, 50, 25, 70+, 45+, 70+, 10, 30, 70, 60+, 17, 19, 5, 26, 28, 5, and 6. This second examination demonstrates how misleading a single examination may be, and how rapid the spread of infection may be in a lot of white mice known to be infected.

The term "jobber" is more appropriate for the fourth dealer because he did not maintain a stock of breeders but bought his mice in small numbers from various miscellaneous individuals in Pennsylvania.

Trained bacteriologists may fail to recognize the rat-bite spirochete when seen for the first time in the dark field. The eye which is trained to the form and movements of *Treponema pallidum* may readily overlook a typical rat-bite spirochete, mistaking it for a motile darting bacillus, especially when the preparation is freshly made or when the organisms are few. After the preparation has stood for perhaps half an hour, the slowed movements permit the spiral form and terminal flagellum at each end to be plainly seen.

The lesson is obvious that before inoculating from a patient to white mice one should be sure that his mice are free from natural infection, or he should avoid the use of white mice in favor of white rats and guinea pigs. In the case reported by Francis [3] inoculation was made from the patient's lymph node to a white rat and then to guinea pigs for three generations.

POLIOMYELITIS IN ALABAMA

The outbreak of poliomyelitis in Alabama by mid-July involved about 10 counties in the northwestern corner out of the 67 counties in the State. It had spread to three adjoining counties in Tennessee to a slight extent. In general, the outbreak appears to be comparable to that which occurred in north central North Carolina last year in intensity, mildness of the individual cases, high proportion of rural cases, and low-age distribution. It is presumably a favorable indication that the Alabama outbreak became apparent some 4 weeks later in the season than did the outbreak in North Carolina.

[3] Francis, Edward Rat-bite fever and relapsing fever in the United States Trans Asso Am Physicians, 1932, 47 143

STATEMENT REGARDING NASAL SPRAY AS PREVENTIVE OF POLIOMYELITIS

The recent experimental work by Drs. Armstrong and Harrison in preventing poliomyelitis in monkeys by the use of a nasal spray has excited so much interest and speculation that the Public Health Service deems it desirable to issue the following statement:

The evidence regarding this method is as yet based entirely upon animal experimentation and the proposed spray is not at present to be regarded as of proved value in the prevention of poliomyelitis in man. It may be advisable to await the results of further trials before giving the method general application. If, however, it is desired to use the solution, it should be sprayed into the nostrils three or four times on alternate days, and thereafter weekly during the presence of poliomyelitis. The spray tip should be pointed upward and backward at an angle of about 45°, and the spraying should be thorough enough to reach the pharynx as well, when a bitter taste will be noted. The early applications at least should be administered by a physician. The experimental work on animals is still being pursued. The tentative procedure is, therefore, subject to such changes as may be dictated by future findings.

The most effective solution so far developed during experimentation on monkeys is prepared as follows:

Solution A: Dissolve 1 gram of picric acid in 100 cc of physiological salt solution (0.85 percent). (Warming facilitates solution of the picric acid.)

Solution B: Dissolve 1 gram of sodium aluminum sulphate (sodium alum) in 100 cc of physiological salt solution (0.85 percent). Any turbidity in this solution should be removed by filtering one or more times through the same filter paper.

Mix solutions A and B in equal amounts. The resulting mixture, which contains 0.5 percent picric acid and 0.5 percent alum is sufficiently antiseptic to prevent the growth of organisms and is ready for use as a spray. Homemade concoctions are not favored.

DEATHS DURING WEEK ENDED JUNE 27, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 27, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,515	7,513
Deaths per 1,000 population, annual basis	10.9	10.5
Deaths under 1 year of age	560	542
Deaths under 1 year of age per 1,000 estimated live births	51	50
Deaths per 1,000 population, annual basis, first 26 weeks of year	12.9	12.2
Data from industrial insurance companies:		
Policies in force	68,470,070	67,900,778
Number of death claims	11,653	12,274
Death claims per 1,000 policies in force, annual rate	8.9	9.4
Death claims per 1,000 policies, first 26 weeks of year, annual rate	10.6	10.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 4, 1936, and July 6, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 4, 1936, and July 6, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935
New England States:								
Maine					169	81	1	0
New Hampshire		1			2	3	0	0
Vermont					58	41	0	0
Massachusetts	1	5			460	160	1	0
Rhode Island		3			3	201	0	0
Connecticut	2	11	1		78	223	0	1
Middle Atlantic States:								
New York	83	27	[1] 1		1,307	1,333	11	11
New Jersey	3	17	1	2	262	635	1	0
Pennsylvania	43	33			616	644	5	8
East North Central States:								
Ohio	11	21	6	1	197	743	1	4
Indiana	7	12	7	8	15	28	1	0
Illinois	20	89	8	13	17	500	8	11
Michigan	10	6	1		29	748	7	0
Wisconsin	1	1	8	11	102	942	0	4
West North Central States:								
Minnesota		1			72	8	0	0
Iowa	5	3			6	13	0	1
Missouri	3	14	11	14	8	30	0	4
North Dakota		1		17	1	1	1	0
South Dakota	2	3			5	42	0	0
Nebraska	3	1			14	40	1	0
Kansas	6	5	3			55	0	2
South Atlantic States:								
Delaware	5				7	5	0	0
Maryland [2] [3]	3	4	1	4	186	32	7	2
District of Columbia [3]	14	7		1	57	20	0	2
Virginia [3]	4	6			89	76	9	8
West Virginia	4	14	3	7	15	84	2	0
North Carolina [3] [4]	8	4			15	8	4	2
South Carolina [4]	1	3	37	27	14	5	1	1
Georgia [4]	3	3					2	1
Florida [4]	1	1			6	9	1	0

See footnotes at end of table.

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Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 4, 1936, and July 6, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935
East South Central States:								
Kentucky	3	4	1	7	7	53	4	2
Tennessee [3]	5	8	33	3	35	18	4	2
Alabama [4]	5	16	3	15	8	24	0	1
Mississippi [2]	5	4					1	0
West South Central States:								
Arkansas	3	3	6	2		2	0	2
Louisiana	1	11	9	15	11	4	0	1
Oklahoma [3]	5	6	12	17	7	56	0	6
Texas [4]	21	17	63	39	86	49	0	3
Mountain States:								
Montana [3]		3			8	38	0	0
Idaho [2]	1			1		3	0	0
Wyoming [3]	1				1	15	0	0
Colorado [3]	2	5			10	66	0	1
New Mexico	4	2	3		18	2	0	0
Arizona	3	1	25	3	27	1	0	0
Utah [2]	1				36	6	0	0
Pacific States:								
Washington	1	1			97	103	1	5
Oregon			4	4	14	66	0	1
California	24	20	444	20	1,467	477	4	2
Total	287	347	686	231	5,642	7,708	78	78
First 27 weeks of year	13,385	15,878	140,399	102,548	259,498	675,961	5,536	3,708

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935
New England States:								
Maine	0	1	6	16	0	0	0	1
New Hampshire	0	0	1	6	0	0	0	0
Vermont	0	0	15	1	0	0	0	0
Massachusetts	0	1	74	105	0	0	2	2
Rhode Island	0	1	6	1	0	0	0	1
Connecticut	0	0	14	23	0	0	0	0
Middle Atlantic States:								
New York	3	11	293	286	0	0	8	7
New Jersey	1	0	80	41	0	0	3	3
Pennsylvania	1	0	379	209	0	0	14	12
East North Central States:								
Ohio	0	1	98	113	0	2	9	25
Indiana	1	0	27	22	1	3	0	8
Illinois	2	2	235	303	17	1	6	12
Michigan	0	2	204	102	0	2	5	10
Wisconsin	0	1	136	199	9	19	2	5
West North Central States:								
Minnesota	0	1	61	74	13	7	2	22
Iowa	0	0	41	24	7	10	2	0
Missouri	1	1	26	15	6	1	6	12
North Dakota	0	0	3	9	3	1	0	0
South Dakota	0	1	15	10	4	6	0	2
Nebraska	0	0	16	9	10	17	0	0
Kansas	0	1	51	23	2	4	5	5
South Atlantic States:								
Delaware	0	0		3	0	0	0	2
Maryland [2,3]	0	1	24	18	0	0	2	4
District of Columbia [2]	0	0	9	12	0	0	0	0
Virginia [2]	1	28	13	8	0	0	1	11
West Virginia	1	1	20	25	1	0	2	8
North Carolina [2,4]	0	55	5	15	0	0	6	27
South Carolina [4]	0	0	2	2	0	0	9	29
Georgia [4]	3	0	4		0	0	22	19
Florida [4]	1	2	2	5	0	0	0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 4, 1936, and July 6, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935	Week ended July 4, 1936	Week ended July 6, 1935
East South Central States:								
Kentucky	1	0	14	--------	0	1	16	16
Tennessee [3]	1	5	18	11	0	0	17	30
Alabama [4]	36	2	7	8	0	0	10	32
Mississippi [2]	0	0	4	5	0	0	15	9
West South Central States:								
Arkansas	0	0	--------	3	0	4	4	17
Louisiana	0	3	5	1	0	0	20	6
Oklahoma [5]	1	1	10	1	0	0	11	19
Texas [4]	0	2	13	14	0	4	35	43
Mountain States:								
Montana [3]	0	0	14	9	19	9	2	3
Idaho [3]	0	0	2	4	2	0	3	0
Wyoming [3]	0	0	11	7	0	8	0	0
Colorado [3]	0	0	26	40	2	3	0	2
New Mexico	0	0	23	7	0	0	7	8
Arizona	0	0	2	6	0	0	3	0
Utah [2]	0	0	19	37	8	0	3	0
Pacific States:								
Washington	0	0	14	17	3	15	14	1
Oregon	0	0	7	18	2	3	9	6
California	7	32	152	79	3	4	5	8
Total	61	156	2,201	1,946	112	124	280	426
First 27 weeks of year	569	1,181	176,884	173,424	5,862	4,976	3,897	5,009

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended July 4, 1936, 12 cases, as follows: Maryland, 1; District of Columbia, 1; Virginia, 1; North Carolina, 2; Tennessee, 3; Montana, 1; Idaho, 1; Wyoming, 1; Colorado, 1.
[4] Typhus fever, week ended July 4, 1936, 60 cases, as follows: North Carolina, 1; South Carolina, 1; Georgia, 22; Florida, 6; Alabama, 18; Texas, 12.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1936										
Hawaii Territory	--------	11	92	--------	20	--------	0	1	0	2
New York	79	161	--------	6	13,412	--------	5	3,224	0	89
June 1936										
Arkansas	1	6	24	146	14	30	0	6	0	15
Connecticut	6	9	5	1	667	--------	0	155	0	5
District of Columbia	8	73	--------	--------	493	--------	0	37	0	2
Iowa	6	11	--------	2	18	--------	0	393	60	5
Nebraska	1	12	3	--------	65	--------	0	148	72	0
South Carolina	--------	58	181	976	84	102	1	5	5	26

May 1936	Cases
Hawaii Territory:	
Chickenpox	63
Dysentery (amebic)	5
Leprosy	6
Mumps	18
Paratyphoid fever	1
Typhus fever	1
Whooping cough	75
New York:	
Chickenpox	1,961
Dysentery (amebic)	2
Dysentery (bacillary)	22
Epidemic encephalitis	14
German measles	1,255
Ophthalmia neonatorum[1]	15
Paratyphoid fever	4
Rabies in animals[1]	6
Septic sore throat	52
Tetanus	6
Trichinosis	15
Undulant fever	16
Vincent's infection[1]	53
Whooping cough	1,013
June 1936	
Anthrax:	
Connecticut	1
Chickenpox:	
Arkansas	27
Connecticut	384
Chickenpox—Continued.	Cases
District of Columbia	24
Iowa	90
Nebraska	60
South Carolina	50
Conjunctivitis, infectious:	
Connecticut	7
Dengue:	
South Carolina	2
Diarrhea:	
South Carolina	609
Epidemic encephalitis:	
District of Columbia	1
South Carolina	1
German measles:	
Connecticut	1,343
Hookworm disease:	
South Carolina	58
Mumps:	
Arkansas	62
Connecticut	319
Iowa	151
Nebraska	54
South Carolina	109
Ophthalmia neonatorum:	
Connecticut	1
South Carolina	2
Paratyphoid fever:	
Arkansas	1
Connecticut	5
South Carolina	9
Rabies in animals:	Cases
South Carolina	27
Rocky Mountain spotted fever:	
District of Columbia	2
Septic sore throat:	
Connecticut	9
Nebraska	5
Tetanus:	
Connecticut	1
South Carolina	2
Trichinosis:	
Connecticut	2
Tularemia:	
Arkansas	1
District of Columbia	1
South Carolina	1
Typhus fever:	
South Carolina	3
Undulant fever:	
Arkansas	7
Connecticut	12
District of Columbia	1
Iowa	13
Whooping cough:	
Arkansas	15
Connecticut	296
District of Columbia	134
Iowa	60
Nebraska	14
South Carolina	53

[1] Exclusive of New York City.

PLAGUE INFECTION IN LASSEN, MODOC, AND SANTA CRUZ COUNTIES, CALIF., AND BONNEVILLE COUNTY, IDAHO

The Director of Public Health of California has reported positive findings for plague in 4 Oregon squirrels from Lassen County, received at the laboratory June 26 and 30, 1936, 8 squirrels from Modoc County, received on June 20 and 30, and 29 squirrels from Santa Cruz County, received June 25 and 26.

Three of the squirrels from Lassen County were from ranches 15 miles east and 12 miles south of Adin, and 1, received June 30, was from a ranch 7 miles south and 8 miles west of Adin. Two of the squirrels from Modoc County were from places 1 mile south and 2 miles south and 2 miles west of Buck Creek Ranger Station, Fandango Valley, 1 was from near Hackamore C. C. C. Camp, Modoc National Forest, 3 were from places 7 and 8 miles north and 5 miles east of Davis Creek, and 2 were from places 6 miles south and 7 miles south and 1 mile west of Pine Creek. Of the 29 squirrels from Santa Cruz County, 21 were from ranches 6 miles east and 4 miles northeast of Watsonville, and 8 were from a ranch at Chittenden Station.

Plague infection has been reported proved, on June 9, 11, and 12, by animal inoculation, in fleas taken from 123 squirrels, *Citellus armatus*, from a ranch 23 miles southeast of Idaho Falls, Bonneville County, Idaho.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 27, 1933

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	74	2	0	0	0	0	5	22
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	9
Nashua	0	------	0	3	0	0	0	0	0	0	--------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	6	0	0	0	0	0	2	14
Rutland	0	------	0	5	1	0	0	0	0	0	4
Massachusetts:											
Boston	8	------	0	174	23	30	0	7	0	41	210
Fall River	0	------	0	0	3	1	0	1	0	3	27
Springfield	0	------	0	1	1	1	0	1	2	5	35
Worcester	0	------	0	59	0	7	0	2	0	5	43
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	--------
Providence	0	------	0	2	1	13	0	1	0	1	60
Connecticut:											
Bridgeport	0	------	0	2	1	0	0	0	0	0	39
Hartford	0	------	0	1	2	8	0	1	0	2	37
New Haven	0	------	0	0	1	0	0	1	1	10	37
New York:											
Buffalo	0	------	0	75	4	11	0	4	0	7	144
New York	83	4	2	727	54	144	0	94	5	94	1,330
Rochester	0	------	0	0	5	4	0	1	0	0	47
Syracuse	0	------	0	51	0	6	0	1	0	16	47
New Jersey:											
Camden	0	------	0	8	0	1	0	0	1	0	23
Newark	0	------	0	26	3	17	0	7	0	22	90
Trenton	0	------	0	2	1	8	0	2	0	7	25
Pennsylvania:											
Philadelphia	4	8	1	182	13	85	0	24	2	56	424
Pittsburgh	2	------	1	5	10	72	0	3	0	84	137
Reading	1	------	0	11	0	8	0	0	0	2	20
Scranton	0	------	--------	0	-------	0	0	-------	0	0	--------
Ohio:											
Cincinnati	4	2	0	3	5	9	0	9	2	0	112
Cleveland	4	1	0	120	10	82	0	12	0	90	162
Columbus	4	1	1	2	3	3	0	6	0	10	64
Toledo	0	2	2	8	6	1	0	3	0	17	59
Indiana:											
Anderson	0	------	0	0	0	7	0	0	0	3	8
Fort Wayne	5	------	0	0	1	1	0	0	0	0	17
Indianapolis	0	------	2	3	10	4	0	8	0	11	118
South Bend	0	------	0	0	2	0	0	0	0	1	21
Terre Haute	0	------	0	0	0	0	0	0	0	0	26
Illinois:											
Alton	0	------	0	0	2	5	0	0	0	0	8
Chicago	20	2	2	10	40	93	0	30	0	65	619
Elgin	0	------	0	1	0	0	0	0	0	3	8
Moline	0	------	0	2	0	2	0	0	0	0	7
Springfield	0	1	0	2	0	3	0	1	0	3	17
Michigan:											
Detroit	3	------	2	16	16	114	0	19	1	172	264
Flint	0	------	0	0	1	5	0	1	0	14	26
Grand Rapids	0	------	0	1	2	4	0	0	0	8	33
Wisconsin:											
Kenosha	0	------	0	0	0	2	4	0	0	1	4
Milwaukee	0	------	0	24	5	61	0	3	1	66	85
Racine	0	------	0	1	1	4	0	0	0	2	12
Superior	0	------	0	0	0	8	0	0	0	0	6
Minnesota:											
Duluth	0	------	0	3	8	6	0	0	0	17	26
Minneapolis	2	------	2	28	8	27	0	0	0	2	96
St. Paul	0	------	0	72	2	11	0	5	0	6	44

See footnotes at end of table.

City reports for week ended June 27, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	3	-	-	0	-	0	0	-	0	3	-
Davenport	0	-	-	0	-	2	0	-	0	0	-
Des Moines	2	-	-	2	-	0	2	-	0	0	26
Sioux City	0	-	-	3	-	5	5	-	0	0	-
Waterloo	0	-	-	0	-	6	0	-	0	0	-
Missouri:											
Kansas City	2	-	0	3	2	28	0	4	0	0	92
St. Joseph	-	-	-	-	-	-	-	-	-	-	-
St. Louis	7	-	-	14	9	21	0	10	3	12	217
North Dakota:											
Fargo	0	-	0	0	1	3	0	0	0	0	15
Grand Forks	0	-	-	0	-	0	0	-	0	0	-
Minot	0	-	0	0	-	2	0	-	0	0	7
South Dakota:											
Aberdeen	0	-	-	0	-	0	0	-	0	0	-
Nebraska:											
Omaha	0	-	0	4	5	9	3	1	0	1	55
Kansas:											
Lawrence	0	-	0	0	0	0	0	0	0	0	-
Topeka	-	-	-	-	-	-	-	-	-	-	-
Wichita	0	-	0	1	0	0	0	0	0	0	27
Delaware:											
Wilmington	0	-	0	3	0	0	0	1	0	2	24
Maryland:											
Baltimore	2	2	2	171	12	7	0	8	1	82	192
Cumberland	0	-	0	0	0	1	0	1	0	0	8
Frederick	0	-	0	0	0	0	0	0	0	1	5
District of Columbia:											
Washington	5	-	0	133	8	6	0	13	0	33	155
Virginia:											
Lynchburg	0	-	0	0	0	0	0	0	0	3	8
Richmond	0	-	1	0	2	5	0	2	1	0	51
Roanoke	0	-	0	2	0	1	0	0	1	0	6
West Virginia:											
Charleston	0	1	0	0	2	1	0	2	0	4	17
Wheeling	0	-	0	11	4	0	0	0	0	0	21
North Carolina:											
Gastonia	0	3	0	0	0	0	0	0	0	0	-
Raleigh	0	-	0	0	2	0	0	0	0	0	19
Wilmington	0	-	0	0	1	0	0	0	0	2	10
Winston-Salem	0	-	0	1	1	0	0	2	0	0	23
South Carolina:											
Charleston	0	-	0	0	1	0	0	0	1	1	18
Columbia	-	-	-	-	-	-	-	-	-	-	-
Florence	0	-	0	0	2	0	0	1	0	3	12
Georgia:											
Atlanta	2	3	0	2	6	2	0	5	1	1	93
Brunswick	0	-	0	0	0	0	0	0	0	0	1
Savannah	3	-	0	0	0	1	0	2	2	0	35
Florida:											
Miami	0	-	0	2	0	0	0	3	0	6	30
Tampa	0	-	0	4	2	0	0	1	0	0	26
Kentucky:											
Ashland	0	-	0	0	0	0	0	0	0	0	-
Covington	0	-	0	1	0	0	0	0	0	0	16
Lexington	0	-	0	0	1	0	0	2	1	2	21
Louisville	1	-	1	4	8	5	0	2	1	5	67
Tennessee:											
Knoxville	2	-	0	1	5	0	0	2	2	0	24
Memphis	1	-	0	0	2	0	0	3	1	16	88
Nashville	0	-	0	10	5	1	0	4	1	0	60
Alabama:											
Birmingham	1	-	0	1	3	0	0	2	5	1	66
Mobile	0	-	1	0	2	0	0	1	0	0	19
Montgomery	0	1	-	0	-	0	0	-	0	0	-
Arkansas:											
Fort Smith	0	-	-	0	-	0	0	-	0	0	-
Little Rock	0	-	0	0	0	0	0	2	0	0	-
Louisiana:											
Lake Charles	0	-	0	1	0	0	0	0	0	0	7
New Orleans	4	2	0	0	15	0	0	15	0	17	157
Shreveport	0	-	0	0	4	2	0	4	1	0	47

See footnotes at end of table.

City reports for week ended June 27, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
Oklahoma:											
Oklahoma City	1	6	0	2	3	2	0	1	3	2	56
Tulsa	0			0		3	0		0	2	
Texas:											
Dallas	3		0	32	10	0	0	4	1	1	81
Fort Worth	0		0	8	3	2	0	2	0	0	57
Galveston	0		0	0	6	0	0	3	0	0	23
Houston	3		0	0	3	1	0	6	0	0	82
San Antonio	3		0	2	9	0	0	8	0	0	105
Montana:											
Billings	0		0	1	0	3	0	0	0	0	5
Great Falls	0		0	1	0	0	2	0	0	2	7
Helena	0		0	1	0	2	1	0	0	0	7
Missoula	0		0	0	0	2	0	0	0	0	5
Idaho:											
Boise	0		0	0	2	0	0	0	0	0	6
Colorado:											
Colorado Springs	0		0	0	0	1	0	1	0	0	9
Denver	2		1	8	11	6	1	2	0	46	87
Pueblo	0		0	1	1	4	0	1	0	0	15
New Mexico:											
Albuquerque	0		0	6	1	3	0	4	0	0	16
Utah:											
Salt Lake City	1		1	9	2	11	3	1	0	7	40
Nevada:											
Reno											
Washington:											
Seattle	0			53	1	2	1	5	1	8	56
Spokane	0			10	2	9	0	1	0	6	19
Tacoma	0		0	5	3	3	0	0	0	0	32
Oregon:											
Portland	0	1	0	3	5	4	1	2	0	19	85
Salem	0			3		0	0		0	0	
California:											
Los Angeles	7	5	0	83	12	28	0	30	0	49	323
Sacramento	0		0	0	0	6	0	4	1	13	22
San Francisco	0	1	0	37	5	42	0	7	0	3	151

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Rhode Island:			
Providence	0	1	0
New York:			
New York	11	5	2
Pennsylvania:			
Philadelphia	2	1	0
Pittsburgh	0	1	0
Ohio:			
Cleveland	1	1	0
Illinois:			
Chicago	5	3	0
Springfield	1	0	0
Michigan:			
Detroit	3	0	0
Flint	0	0	1
Delaware:			
Wilmington	1	0	0
Maryland:			
Baltimore	1	0	0
District of Columbia:			
Washington	1	0	0
Virginia:			
Lynchburg	2	0	0
West Virginia:			
Wheeling	0	1	0
South Carolina:			
Charleston	2	1	0
Kentucky:			
Louisville	0	1	0
Tennessee:			
Knoxville	1	0	0
Alabama:			
Birmingham	1	0	0
Louisiana:			
New Orleans	1	1	0
Shreveport	0	1	0
Washington:			
Spokane	1	0	0
California:			
Los Angeles	2	1	3

Epidemic encephalitis.—Cases: Washington, D. C., 1; Miami, 1.

Pellagra.—Cases: Baltimore, 1; Wilmington, N. C., 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 4; Birmingham, 1; New Orleans, 1.

Typhus fever.—Cases: Newark, 1; Charleston, S. C., 1; Savannah, 1.

FOREIGN AND INSULAR

IRISH FREE STATE

Vital statistics—First quarter 1936.—The following statistics for the Irish Free State for the quarter ended March 31, 1936, are taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

	Number	Rates per 1,000 population
Population	3,033,000	
Marriages	3,807	5.0
Births	14,429	19.0
Total deaths	12,869	17.0
Deaths under 1 year of age	1,223	(1)
Deaths from—		
Cancer	891	1.18
Diarrhea and enteritis (under 2 years of age)	142	
Diphtheria	87	
Influenza	268	.35
Measles	65	
Puerperal sepsis	25	[2] 1.73
Scarlet fever	40	
Tuberculosis (all forms)	935	1.23
Typhoid fever	13	
Whooping cough	71	

[1] Deaths under 1 year per 1,000 births, 85.
[2] Per 1,000 births.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 26, 1936, pages 855–870. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Negapatam.—During the week ended June 27, 1936, 13 cases of cholera with 9 deaths were reported at Negapatam, India.

Plague

Senegal—Dakar.—During the week ended June 27, 1936, 1 case of plague with 1 death was reported at Dakar, Senegal.

United States.—A report of plague-infection in rodents in Lassen, Modoc, and Santa Cruz Counties, California, and in Bonneville County, Idaho, appears on page 982 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Portugal—Oporto.—During the week ended June 13, 1936, 1 case of smallpox was reported at Oporto, Portugal.

Straits Settlements—Singapore.—During the week ended June 20, 1936, 1 imported case of smallpox was reported at Singapore, Straits Settlements.

Typhus Fever

Egypt—Suez.—During the week ended June 27, 1936, 1 case of typhus fever was reported at Suez, Egypt.

Iraq—Baghdad.—During the week ended June 27, 1936, 1 case of typhus fever was reported at Baghdad, Iraq.

Yellow Fever

Bolivia—Santa Cruz Department—La Pesca.—During the month of May 1936, 1 case of yellow fever was reported at La Pesca, Santa Cruz Department, Bolivia.

Brazil.—Yellow fever has been reported in Brazil as follows: Sao Joao dos Patos, Maranhao State, May 28, 1936, 1 case, 1 death; Minas Geraes State, Dourados, May 21, 1936, 1 case, 1 death; Uberaba, May 23, 1936, 1 case, 1 death; Sao Paulo State, Altinopolis, May 26, 1936, 1 case, 1 death; Cajuru, May 22, 1936, 1 case, 1 death; Tambahu, May 23 and 24, 1936, 2 cases, 2 deaths.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE FIRST QUARTER OF 1936 [1]

By DEAN K. BRUNDAGE, *Senior Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

The incidence rate of cases of illness causing disability for 8 calendar days or longer among 146,411 male industrial employees in the first quarter of 1936 was 7 percent above the rate recorded for the first 3 months of 1935. The rate in 1936, however, was 4 percent below the average frequency of cases during the first 3 months of the preceding 5 years; i. e., 1931–35. Sickness rates for the initial quarter of the years 1935 and 1936 were based on the experience of employees of the same companies, 29 in number. The rates for the first quarter of the years 1931 to 1935 included 24 of these companies.

The respiratory group of diseases accounted for the major portion of the increase in the incidence of illness in the first quarter of 1936 as compared with the corresponding period of 1935. The frequency of new cases of respiratory disease, expressed in terms of the annual number of cases per 1,000 men, was 54.0 for the first quarter of 1936 as compared with 48.6 for the January-March period of 1935. However, both rates are below the 5-year average of 56.3 new cases of respiratory disease per 1,000 men.

With the exception of tuberculosis of the respiratory system, each respiratory disease subgroup showed higher incidence rates in the first quarter of 1936 than in the corresponding quarter of 1935. The frequency of disabilities of 8 days and longer on account of diseases of the pharynx and tonsils was only slightly higher than in the first quarter of 1935, but the incidence rate of bronchitis (acute and chronic) was higher by nearly one-half (47 percent), exceeding by 38 percent the 5-year average for this period of the year.

Another development of an unfavorable nature was an increase in the number of cases of pneumonia (all forms). In the first quarter of 1936 pneumonia occurred at a rate which was 45 percent above its average incidence during the corresponding period of the years 1931

[1] A report covering the final quarter of 1935 and the entire year 1935 was published in the Public Health Reports for May 22, 1936, vol. 51, no. 21, pages 613–615.

to 1935, inclusive. Mortality from pneumonia also increased in the industrial population of the country during the first quarter of 1936.[2]

The rate of 4.8 new cases of pneumonia per 1,000 men is the highest observed for any quarter year since the first 3 months of 1929, when pneumonia occurred at the rate of 5.1 cases annually per 1,000 men. In the first 3 months of 1932 the incidence rate fell to 2.6, which was the lowest first-quarter frequency recorded for pneumonia since the inauguration of industrial morbidity reporting 15 years ago. There was very little change in the frequency of the disease during the winter months of 1933 and 1934, but the incidence rate increased appreciably in 1935 (to 3.8), and rose to 4.8 during the first quarter of 1936, as has been mentioned. This trend is suggestive of correlation between pneumonia frequency and the rate of industrial activity, a subject which will be discussed in more detail in a subsequent paper.

The frequency of influenza was slightly higher than in the corresponding period of 1935, but was appreciably below the 5-year average. A sharp drop in fatal influenza cases during the first quarter of 1936 is reported by the Metropolitan Life Insurance Co.[3]

A very large decrease is shown in the occurrence of new cases of respiratory tuberculosis during the period under consideration, indicative of a continuation of the very favorable trend both in the frequency of new cases and in the mortality from this disease. Up to the end of March the improvement over last year has been so marked as practically to assure new minimum case and death rates for tuberculosis in the present year.

Nonrespiratory diseases as a whole occurred at very slightly higher incidence during the January-March period of 1936 than in the corresponding period of the preceding year. The frequency of appendicitis, hernia, diseases of the organs of locomotion, and of the infectious and parasitic diseases was greater than in the same period of 1935. The only nonrespiratory subgroup, however, which showed rates above the average for the 5-year period were (*a*) diarrhea and enteritis, (*b*) appendicitis, and (*c*) infectious and parasitic diseases. Morbidity from the principal degenerative diseases was substantially at the level of the 5-year average. Definite improvement appears to have occurred in the incidence rate of the rheumatic group of diseases among the male employees of the companies which have made their morbidity reports available.

[2] Cf. Statistical Bulletin, Metropolitan Life Insurance Co., vol. 17, no. 4, April 1936, p. 5.
[3] Idem.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the first quarter of 1936, compared with the first quarter of several preceding years. (Male morbidity experience of industrial companies which reported their cases to the United States Public Health Service)* [1]

Diseases and disease groups which caused disability [Numbers in parentheses are disease title numbers from the International List of Causes of Death, fourth revision, Paris, 1929]	Annual number of disabilities per 1,000 men in the first quarter of—		
	1936	1935	5 years 1931-35 [2]
Sickness and nonindustrial injuries [3]	111.4	104.0	115.6
Nonindustrial injuries	11.1	10.2	10.9
Sickness [3]	100.3	93.8	104.7
Respiratory diseases	54.0	48.6	56.3
Bronchitis, acute and chronic (106)	7.2	4.9	5.2
Diseases of the pharynx and tonsils (115a)	5.5	5.3	5.7
Influenza and grippe (11)	29.2	27.7	35.4
Pneumonia, all forms (107-109)	4.8	3.9	3.3
Tuberculosis of the respiratory system (23)	.7	1.1	1.1
Other respiratory diseases (104, 105, 110-114)	6.6	5.7	5.6
Nonrespiratory diseases	46.3	45.2	48.4
Diseases of the stomach, cancer excepted (117-118)	3.3	3.7	3.8
Diarrhea and enteritis (120)	1.1	1.0	.9
Appendicitis (121)	3.8	3.4	3.5
Hernia (122a)	1.7	1.3	1.7
Other digestive diseases (115b, 116, 122b-129)	2.8	2.9	3.1
Rheumatic group, total	10.0	10.5	12.0
Rheumatism, acute and chronic (56, 57)	4.3	4.7	6.0
Diseases of the organs of locomotion (156b)	3.4	3.0	3.5
Neuralgia, neuritis, sciatica (87a)	2.3	2.8	2.5
Neurasthenia and the like (part of 84)	.8	.9	1.0
Other diseases of the nervous system (78-85, part of 87b)	1.3	1.1	1.3
Diseases of the heart and arteries, and nephritis (90-99, 102, 130-132)	4.1	4.4	4.2
Other genito-urinary diseases (133-138)	2.4	2.5	2.4
Diseases of the skin (151-153)	2.1	2.4	2.5
Infectious and parasitic diseases except influenza (1-10, 12-22, 24-33, 36-44)	3.5	2.7	3.2
Ill-defined and unknown causes (200)	2.4	2.0	1.9
All other diseases (45-55, 58-77, 88, 89, 100, 101, 103, 154-156a, 157, 162)	6.7	6.4	6.9
Average number of males covered in the record	146,411	138,234	144,924
Number of companies included	29	29	[2] 24

[1] In 1935 and 1936 the same companies are included.

[2] The rates for the first quarter of the years 1931 to 1935 include 24 of the 29 companies reporting in 1935 and 1936. These companies employed an average of 114,404 men during the 5-year period, or 79 percent of the 144,960 men representing the sample population for the 5-year averages.

[3] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.

COMMUNICABLE DISEASES AND ACTIVITIES FOR THEIR CONTROL IN THE BRUNSWICK-GREENSVILLE AREA [1]

Brunswick-Greensville Health Administration Studies No. 7

By J. O. DEAN, *Passed Assistant Surgeon*, and ELLIOT H. PENNELL, *Associate Statistician, United States Public Health Service*

INTRODUCTION

The purpose of this paper is to present an analysis of the program of a rural health department in relation to acute communicable disease. The basic data apply to Brunswick and Greensville Counties, Virginia, and were taken both from records of the health department and from schedules completed by field workers of the United States Public Health Service who visited a representative sample of homes which included 1,009 families, or approximately one-sixth of the bi-

[1] From Office of Studies of Public Health Methods, in cooperation with Division of Domestic Quarantine.

county population. The records provide a picture of actual service performed by the individual members of the health department staff on specific problems, whereas the schedules make available a general description of the family and environment, of the total health problems, and of the services which were received through public and private agencies operating in the locality, including physicians, dentists, nurses, and midwives engaged in private practice. A complete description of the Brunswick-Greensville area, the health department and its program, and the method of collecting the data has been given in previous papers to which the reader is referred (*1, 2, 3, 4, 5, 6*).

The people living within Brunswick and Greensville Counties experienced the same general needs for communicable disease protection as may be found in other rural communities, namely, medical attention for those contracting disease, regulatory measures for reducing the spread of disease from infected persons to others, sanitation services, and immunization. The extent to which these measures were needed is largely indicated by the communicable disease mortality and morbidity experienced.

COMMUNICABLE DISEASE MORTALITY AND MORBIDITY

MORTALITY

Average annual mortality rates in Brunswick and Greensville Counties for a selected group of communicable diseases, based upon two 5-year periods, 1921–25 and 1926–30, are given in table 1. A comparison of the sum of the rates for the period 1921–25 with the sum of those for 1926–30, given in table 1, indicates that the bicounty area had experienced a decline in communicable disease mortality. The mortality rate for each of the diseases listed in the table except influenza and measles was lower in the second 5-year period than in the first for both counties and for the white- and colored-population groups. In the second period, 1926–30, influenza mortality showed a definite increase over the preceding 5-year period, particularly in Greensville County, where the increase in influenza and measles mortality more than offset the reductions for several other communicable diseases in that county. During 1926–30 the sum of the rates for Greensville County was about 46 percent higher than that for Brunswick County. The table shows that mortality rates were usually higher among the Negroes than the whites, particularly in the second period when the rates for several of the diseases were from 2 to 4 times higher for the Negro group than for the white group. Average annual mortality rates for the Negro had dropped, however, for each of the diseases except influenza.

The period since 1930 for which mortality figures are available is considered too short for comparative purposes. However, after the

figures of the total area for the years 1931–33 were reviewed, decreases were noted in the rates for diarrhea and dysentery among those under 2 years of age, diphtheria, malaria, measles, and typhoid fever; there were no deaths from scarlet fever, influenza mortality continued to increase, and the rate for whooping cough showed a decided rise.

A comparison of the average annual communicable disease mortality rates for the 5-year period 1926–30 in Brunswick and Greensville Counties was made with those for the rural part of the State of Virginia. It was found that the sum of the rates for the diseases listed in table 1 was somewhat lower for the two counties than for the rural part of the State, in spite of the fact that the rates for the former were based upon a population having a high percentage of colored individuals. The rates for diarrhea and dysentery affecting children under 2 years of age, malaria, measles, and the typhoid fevers were higher in the counties. When the comparisons were made on the basis of color, the rates were somewhat more favorable for the counties. While the sum of the rates for the diseases listed was slightly lower for the two counties than for the rural part of the State of Virginia, the difference in the rates for white individuals was marked, being nearly 30 percent lower in the counties.

TABLE 1.—*Average annual death rates during the 5-year periods, 1921–25 and 1926–30, for selected communicable diseases in the Brunswick-Greensville area, according to color and county*

Disease	Death rate per 100,000 persons from specified diseases									
	Brunswick and Greensville Counties						Brunswick County		Greensville County	
	Total		White		Colored					
	1921–25	1926–30	1921–25	1926–30	1921–25	1926–30	1921–25	1926–30	1921–25	1926–30
Total for the diseases listed	157.4	122.7	126.3	83.8	184.2	155.7	161.2	107.1	153.9	156.3
Diarrhea and dysentery under 2 years of age	47.0	32.0	34.4	21.0	56.5	45.0	47.0	37.9	47.5	30.6
Diphtheria	17.5	7.7	23.0	7.0	13.6	8.2	21.1	12.6	11.5	0
Influenza	44.0	54.0	38.8	39.0	51.3	64.6	43.0	38.0	45.8	80.0
Malaria	4.2	2.4	4.3	2.8	4.2	2.0	2.0	1.0	8.2	4.6
Measles	7.2	7.1	2.8	4.2	10.5	9.2	7.7	3.0	6.3	13.7
Scarlet fever	1.2	0	1.4	0	1.0	0	2.0	0	0	0
Typhoid fever	12.7	9.5	6.6	5.6	15.7	12.3	9.6	6.8	18.0	13.7
Whooping cough	23.6	10.0	13.0	4.2	31.4	14.4	28.8	7.8	16.4	13.7

MORBIDITY

The best information available on communicable disease incidence in the area is an estimate based upon illness data obtained from the surveyed sample of families. This estimate is regarded as a conservative one, since experience in other surveys of a similar character has indicated that morbidity figures for a 12-month period based upon information obtained at a single visit would represent an under-

statement of illness because of failure of the informant to recall cases where the course of the disease was mild in character. In other words, the figures represent illness only insofar as it is recognized and reported by the family. There are doubtless instances where the diagnoses of certain illnesses would have been corrected had it been possible to obtain a medical opinion following an examination at the time the illnesses actually occurred; it is believed, however, that the survey data provide the essential details of the morbidity experience in Brunswick and Greensville Counties for the 12-month survey period.

The number of cases of notifiable acute communicable disease that was stated to have occurred in the surveyed sample of families is presented in table 2 with the annual morbidity rates per 1,000 persons, the estimated number of cases occurring in the total bicounty population for the same period, and the number of cases reported to the State from the area for the calendar year most nearly approximating the survey period. It is recognized that the number of cases of any particular disease in a given area may vary markedly from year to year, especially if small populations are considered. The estimated total of about 3,370 cases of disease for the diagnoses listed demonstrates, however, that the problem of communicable disease control was much more extensive than was shown by the number of cases reported from the area to the State.

TABLE 2.—*Cases of certain reportable communicable diseases: estimated morbidity rates per 1,000 persons; and estimated number of cases for the entire area, based on the family survey; and the number of cases reported to the State health department during the calendar year most nearly approximating the survey period in Brunswick and Greensville Counties*

Disease	Number of cases reported in surveyed families	Morbidity rate per 1,000 individuals	Estimated number of cases for the [illegible]	Number of cases reported to State health department
Total for the diseases listed				
[illegible]	[illegible]	2.1	72	0
Chickenpox	[illegible]	[illegible]	[illegible]	2
Diarrhea and dysentery	[illegible]	[illegible]	[illegible]	22
Diphtheria	1	[illegible]	[illegible]	34
Influenza	[illegible]	[illegible]	[illegible]	134
M[illegible]	[illegible]	[illegible]	[illegible]	3
Measles	[illegible]	[illegible]	[illegible]	17
Meningococcus meningitis	0	0	0	1
Mumps	[illegible]	[illegible]	[illegible]	0
Pneumonia	[illegible]	[illegible]	[illegible]	37
Scarlet fever	[illegible]	[illegible]	[illegible]	27
[illegible]	2	[illegible]	12	0
[illegible]	[illegible]	[illegible]	12	21
Typhoid fever	1	[illegible]	[illegible]	0
Whooping cough	[illegible]	7.5	252	32

CONTROL FACILITIES

The principal facilities for the control of communicable diseases were those provided by the local physicians, the local health department staff, and the personnel of the State health department. Legal

authority for the institution of control measures was provided by State regulations.

There were 18 local physicians residing in the bicounty area whose participation in control activities was limited for the most part to the care of the sick and the reporting of cases to the health department. Most of the cases were cared for in the home, as there were no hospitals in the area and it was contrary to the policy of nearby hospitals to admit patients having communicable disease other than typhoid fever. The superintendent of the poor in each county could employ a physician to care for indigent persons acutely ill with a communicable disease. This was done, as a rule, after the health officer had investigated the cases and had reported that medical aid was urgently needed. The private physicians in the area performed very little immunization work.

A medical health officer, two nurses, and a sanitation officer made up the staff of the local health department. Authority to investigate communicable diseases and to impose regulatory measures including quarantine and isolation was vested in the health officer. By agreement with the local physicians, the administration of intensive immunization programs to protect the population against outbreaks of diphtheria, smallpox, and typhoid fever was a function of the health department. The health officer was available for consultation with physicians where a communicable disease was suspected. When cases of acute illness without medical care were found by members of the health department staff, the family was urged to consult a private physician; and in certain instances, where for financial reasons this could not be done, the case was referred to the superintendent of the poor. A few cases of scabies and impetigo in indigent families were treated by the health department.

Health department nurses working under the direction of the health officer visited cases of communicable disease to instruct some member of the family concerning nursing care of the patient and to encourage placing the patient under medical care if no physician was in attendance. Practically no bedside nursing care was given. These nurses also assisted the health officer in the organization and operation of immunization clinics and, upon the request of the teacher, made inspections of school children.

The sanitation officer carried on a program of environmental sanitation which was largely directed toward the installation of sanitary excreta disposal facilities on all premises. In addition to this, he devoted part of his time to malaria control, especially to the maintenance of drainage ditches. He investigated reported cases of rabies in dogs and exercised some supervision over food-dispensing establishments and roadside semipublic water supplies. The control of milk and foods was largely a function of the State department of agricul-

ture. Some attention was given to screening of homes and to supervision of private water supplies. Public water-purification plants in the county-seat towns were operated by lay attendants under the technical supervision of the State health department.

The State health department made available consultant service of the State epidemiologist to assist in the diagnosis of obscure illnesses where there was some question of communicability, to investigate outbreaks of disease, and to help with the organization and administration of special disease-prevention campaigns. Periodic visits of State supervisors were made to the health unit to observe the work and to suggest possible changes in its program. The State provided free diagnostic laboratory service both to the health department and to the local private physicians. Certain biologicals were furnished by the State to the health department and to the local physicians at cost prices; also printed material of an educational character was available for free distribution.

Regulations for governing communicable diseases and environmental sanitation were prescribed by the State. The regulations applicable to communicable diseases underwent revision during the last month of the study. Those in force during the major part of the study period applied chiefly to quarantine and isolation. The revised regulations, aside from stating quarantine and isolation procedures to be followed, prescribed various other administrative measures to be carried out, such as investigation of source of infection, or concurrent and terminal disinfection. Prior to revision, the regulations for the more common communicable diseases were in brief as follows:

Diphtheria.—Isolation of case for 10 days, with release after 1 negative culture from the nose and throat; or release in less than 10 days with 2 successive negative nose and throat cultures; or release after 28 days if cultures were not taken. Quarantine of contacts under 15 years of age until release of case unless isolated on noninfected premises for 7 days and found to have negative nose and throat cultures.

Measles.—Isolation of case for at least 12 days after appearance of eruption; quarantine of exposed susceptible children for 14 days.

Scarlet fever.—Isolation of case for at least 21 days from date of eruption. Quarantine of contacts under 15 years of age for 7 days if residing on noninfected premises, otherwise quarantine until release of case.

Typhoid fever.—Treatment of discharges of infected persons in such manner as to prevent danger to any other person.

Whooping cough.—Requirement of cases to stay beyond 30 feet from any susceptible person until 28 days have passed. Observation of same restrictions by exposed susceptible persons until lapse of 14 days from time of exposure.

Certificates of deaths from all causes, including communicable diseases, were filed directly by physicians with local registrars, who in turn transmitted them at the end of each month to the State registrar of vital statistics. While this did not provide the local

health authorities with a current file of deaths from communicable diseases in the area, the State department of health did call to their attention any unusual number of deaths from a particular cause that might suggest an epidemic.

The State regulations provided that physicians should report promptly to the local health officer any cases of certain notifiable diseases under their care so that the prescribed regulatory measures might be instituted. Teachers were instructed to exclude from school all children showing evidence of skin eruptions, skin parasites, or communicable diseases, as well as children coming from homes where communicable diseases were known to exist, and to report them to the health officer for investigation before readmittance. Successful vaccination against smallpox was a prerequisite for school attendance. Placarding of premises was required for acute anterior poliomyelitis, diphtheria, meningococcus meningitis, scarlet fever, and smallpox.

PERFORMANCE

REPORTING PRACTICE

Many cases of communicable disease occurring in the Brunswick-Greensville area were not reported to the State. Evidence of this is presented in table 3, which lists the number of reported cases, the number of deaths, and the ratio of reported cases to deaths for several notifiable diseases for the two 5-year periods. The ratios in themselves indicate incomplete reporting: in the period 1926–30, tuberculosis had a ratio of 0.6, showing that fewer cases were reported than deaths; no cases of pellagra were reported although 15 deaths occurred; and the ratios of 6.5 for diphtheria and 2.5 for typhoid fever were far below those (13 and 8, respectively) suggested as desirable standards by the Committee on Administrative Practice of the American Public Health Association in the Appraisal Form for Rural Health Work (7). While the reporting practice was unsatisfactory in regard to completeness, it apparently had become less complete, as evinced by lower ratios for the later of the two 5-year periods. The lower ratio of cases to deaths might suggest that an increase in case fatality had occurred, but this is not an acceptable explanation in view of the generally mild character and declining mortality rates for most communicable diseases. In view of the figures presented in table 2 (which gives the number of cases of notifiable communicable diseases stated by the family informant to have occurred among the surveyed group of families in the preceding 12 months, the number of cases estimated for the entire bicounty population, and the number of cases reported to the State health department during a 12-month period approximating that covered by the survey), it appears that the

number of cases reported to the State health department was less than 10 percent of the number estimated to have occurred.

TABLE 3.—*Reported cases and deaths and ratio of reported cases to deaths for selected notifiable diseases for two 5-year periods, 1921–25 and 1926–30, in Brunswick and Greensville Counties*

Disease	1921–25			1926–30		
	Cases	Deaths	Ratio of cases to deaths	Cases	Deaths	Ratio of cases to deaths
Diarrhea and dysentery	1,236	104	11.9	355	75	4.7
Diphtheria	[illegible]	[illegible]	7.4	85	13	6.5
Malaria	1,276	7	182.3	233	4	58.2
Measles	(2)	12	-------	(2)	12	-------
Influenza	0	1	0	0	15	0
Scarlet fever	78	2	39.0	25	0	-------
Smallpox	26	0	-------	5	0	-------
Tuberculosis	[illegible]	178	.9	111	178	.6
Typhoid fever	[illegible]	21	7.2	40	16	2.5
Whooping cough	(2)	[illegible]	-------	(2)	17	-------

Part of the incomplete reporting of notifiable diseases to the State health department may be attributed to the fact that the local health department did not report to the State all cases coming to its knowledge. In a period of 8 months, members of the local health department staff visited 74 cases of notifiable acute communicable disease, but reports for only 47 of this number were received by the State. A great share of incomplete case reporting, however, was related to absence of medical care. Most cases of which the State health department was notified were those attended by physicians; but the majority of the cases did not have a medical attendant and, consequently, were not reported. Table 4, which lists 561 cases of illness from notifiable communicable diseases found in the surveyed sample of families, shows that only 254, or approximately 45 percent of the total number, were attended by a private physician; consequently, notification of a high percentage of cases which occurred within the area is hardly to be expected.

While practically all morbidity reporting from the Brunswick-Greensville area came from private physicians, they reported but a small percentage of the cases they attended. It is estimated that in the entire bicounty population about 1,500 communicable disease cases had a physician in attendance during the period covered by the family survey; yet in approximately the same period only 330 cases were reported to the State, or about 22 percent of the number which presumably physicians could have reported.

TABLE 4.—*Total number of cases of notifiable communicable disease* [illegible] *by private physicians, and* [illegible] *health department staff, according to the* [illegible] *surveyed sample of families in Brunswick and Greensville Counties*

Disease	Number of cases reported in surveyed families	Number of cases attended by private physician	Number of cases attended by member of health department staff	Disease	Number of cases reported in surveyed families	Number of cases attended by private physician	Number of cases attended by member of health department staff
Total for the diseases listed	5[illegible]1	2[illegible]4	30	Malaria	1[illegible]	10	0
				Measles	[illegible]3	11	2
				Mumps	1[illegible]	1[illegible]	0
C[illegible]	12	6	0	Pneumonia	2[illegible]	22	1
C[illegible]	46	11	0	Scarlet fever	6	8	8
L[illegible] and d[illegible]				Smallpox	2	2	0
	80	45	1	Typhoid fever	2	2	1
[illegible]	17	19	14	Typhus fever	1	1	0
I[illegible]	155	62	2	Whooping cough	12	17	1

Although records of only about 10 percent of all notifiable cases of acute communicable disease which occurred within the two counties and only 22 percent of cases with a medical attendant were transmitted to the State health department, much higher percentages than these were reported for cases of certain diseases. On the basis of information obtained from the surveyed sample of families and the records of the State, it is estimated that for a group of diseases against which control measures were emphasized, namely, diphtheria, meningitis, poliomyelitis, scarlet fever, and typhoid fever, about 45 percent of the cases were reported. About 30 percent of diphtheria and 45 percent of scarlet fever cases are estimated to have been reported. Typhoid fever cases presumably were very well reported; 2 cases were found in the surveyed sample of families comprising one-sixth of the total population, and 21 cases of this endemic disease were reported to the State. The percentages of diphtheria and scarlet fever cases reported from Brunswick and Greensville Counties are low in comparison with those found for a group of 68 counties [2] located in the southeastern part of the United States and having full-time health departments. The percentages of cases reported for diphtheria, scarlet fever, and typhoid fever were 84, 72, and 73, respectively, for the 68 counties.

MEDICAL CARE

Approximately 45 percent of the cases of notifiable communicable disease found in the family survey were attended by a private physician. In general, cases which had a medical attendant represented the more serious types of communicable disease. Ninety percent of

[2] Unpublished data on reporting of communicable diseases for 68 counties, collected in 1930 by State and local health departments in cooperation with the U. S. Public Health Service. Data supplied by Division of Sanitary Reports and Statistics, U. S. Public Health Service.

the illnesses attributed to diphtheria, malaria, pneumonia, scarlet fever, typhoid fever, and typhus fever were attended by a physician, while only 25 percent of those attributed to the common communicable diseases of childhood, such as conjunctivitis (pinkeye), chicken pox, measles, mumps, and whooping cough were observed by a physician.

CONTROL MEASURES

The measures which the health department instituted for control of communicable diseases were studied in detail for a period of 8 months with a view to determining how the health department first came into contact with the cases, what control measures were instituted for different diseases, and how each member of the health department participated in the program. This period, roughly speaking, covered the autumn, winter, and spring seasons, when communicable diseases normally are most prevalent. The analysis of administrative-control services is confined to the period of 8 months unless otherwise stated.

NUMBER OF PATIENTS VISITED

Members of the health department staff visited 159 communicable disease patients; 97 of these were diagnosed cases of which 74 were notifiable in character, while the remaining 62 patients represented persons who had been exposed to a case or were suspected of having a communicable disease. The patients represented 81 households; one of the households came under health department supervision at two different times and may therefore be counted twice. Table 5 lists the number of acute communicable disease cases visited in each county by members of the staff in a period of 8 months, also the number which was reported to the State health department.

During the 8 months, 375 cases of notifiable acute communicable disease were reported to the State from the Brunswick-Greensville area. Members of the health department staff visited 47 of this number, or about 12.5 percent of those reported. Of the cases brought to the attention of the State, 319 were reported as influenza or pneumonia, diseases over which health departments ordinarily do not attempt to exercise control. Excluding influenza and pneumonia from consideration, there were 56 cases covering 13 diseases reported to the State, of which number 38, or 68 percent, were visited by health department workers. In contrast, 10 percent of cases from the same 13 diseases found in the surveyed sample of families were visited by health department workers. In 8 months 31 cases were reported to the State for the group of diseases (diphtheria, meningitis, poliomyelitis, scarlet fever, and typhoid fever) which received special attention from the health department. Members of the staff visited 29 of the 31 cases (94 percent) as well as 6 others which were not reported to the State. As already pointed out, 74 notifiable cases

were visited by health department workers, but only 47 of the cases were reported to the State. As shown in table 5, there were 27 cases which were visited but unreported to the State as follows: 1 case of chicken pox, 1 case of diphtheria, 3 cases of gonorrhea, 3 cases of scarlet fever, 4 cases of syphilis, 2 cases of typhoid fever, and 13 cases of whooping cough.

Most of the cases visited by the health officer or health department nurses, as shown by the family survey, were patients attended by a physician. Among 254 cases stated by the family informant to have been attended by a physician, 26, or about 10 percent, were reported to have had visits from either the health officer or nurse, but only 4 of 307 cases unattended by a physician received service from the health department.

TABLE 5.—*Number of cases of communicable disease in Brunswick and Greensville Counties visited by members of health department staff and number of cases reported to the State health department in a period of 8 months*

Disease	Number of communicable disease cases					
	Visited by members of health department staff			Reported to State health department		
	County		Total	County		Total
	Brunswick	Greensville		Brunswick	Greensville	
Notifiable:						
Chicken pox	2	2	4	2	1	3
Diarrhea and dysentery				5		5
Diphtheria	2	6	8	2	5	7
Gonorrhea		3	3	1		1
Influenza		9	9	221	71	292
Malaria					10	10
Measles	2		2	2		2
Meningitis	1		1	1		1
Pneumonia				21	6	27
Poliomyelitis	1		1	1		1
Scarlet fever	18		18	15	1	16
Syphilis	2	3	5	1		1
Typhoid fever	3	4	7	4	2	6
Typhus fever	1	1	2	1	1	2
Whooping cough	8	6	14	1		1
Subtotal	40	34	74	278	97	375
Nonnotifiable:						
Scabies and impetigo	12	10	22			
Vincent's angina		1	1			
Total	52	45	97	278	97	375

KNOWLEDGE OF PATIENTS

Physicians most frequently were responsible for informing the health department of households having communicable disease patients. Among 82 households visited by a member of the staff, sources of first information were as follows: Physicians, 38; members of households, 20; teachers, 8; neighbors, 5; visits to households, 6; and school inspections, 5. Among 46 households having patients

subject to quarantine or isolation, physicians were the source of first information for 34, while in 19 of 36 households in which patients were not subject to restriction the health department was first notified by some member of the family. It is of interest to note that physicians transmitted first knowledge of the case to the health department for only 4 households in which the patient was not subject to quarantine or isolation restrictions, and that a member of the family first informed the health department of only 1 of 46 households subject to such restrictions.

REGULATORY MEASURES INSTITUTED BY HEALTH DEPARTMENT

Reporting of cases by physicians to the State was done through the local health department. Such cases as were reported provided the health department an opportunity of investigating the cases and carrying out whatever measures were prescribed. The number of households represented by each communicable disease seen by the health department and the regulatory measures employed in each are shown in table 6.

TABLE 6.—*Number of households in which communicable-disease patients were under health department supervision and the regulatory measures which were employed*

Type of patient and regulatory measures employed	Number of households and diseases for which patients were seen										
	Diphtheria	Measles	Meningitis	Poliomyelitis	Scarlet fever	Chicken pox	Typhoid fever	Whooping cough	Scabies or impetigo	Other	Total
Case	8	2	1	1	15	4	5	5	9	14	64
Contact but no case	2				2		1				5
Suspect	2						2		1	8	13
Total	12	2	1	1	17	4	8	5	10	22	82
Quarantined because of case	8	2	1	1	15	1 1					28
Quarantined because of contact	2				2						4
Isolation of case							5		8		8
No restriction	2					8	3	5	7	22	42
Total	12	2	1	1	17	4	8	5	10	22	82

1 Case was reported as smallpox.

Of the 82 households seen by members of the health department staff, 32 were placed under quarantine restrictions for having either a case of or contact with communicable disease. Among this latter number 17 were quarantined for scarlet fever, 10 for diphtheria, 2 for measles, 1 for meningococcus meningitis, 1 for poliomyelitis, and 1 for a case finally diagnosed as chicken pox which had been reported as smallpox by the attending physician. Inspection of children in schools for transmissible infectious or parasitic skin diseases led to temporary exclusion from school of children in three families because of scabies. Children with either impetigo or scabies under satisfac-

tory treatment were permitted to continue school attendance. Seven typhoid fever cases in five households were placed under isolation restrictions. The nurses visited five households having one or more cases of whooping cough, but the records did not clearly state what control measures were instituted. All together, patients from 40 households were subjected to the restrictions of quarantine, isolation, or exclusion from school. Among the remaining communicable disease households the health department supervision was limited to instruction regarding measures to be instituted for the care of the patient and for the control of the disease.

PARTICIPATION IN PROGRAM

All members of the health-department staff participated in the control program. It was the stated policy of the health officer to visit all cases of typhoid fever, diphtheria, scarlet fever, measles, meningitis, and poliomyelitis which came to his attention. The policy was well carried out; insofar as the records showed, all such cases, except 2, known to the health department were visited by the health officer. The information obtained from the family survey also indicated that the policy was closely followed. The health officer also visited patients with unusual diseases, such as endemic typhus fever or Rocky Mountain spotted fever, as well as patients having any of the common communicable diseases in which there was some special problem, usually that of diagnosis, for which his assistance was sought. Occasionally the nurses visited patients to carry out control measures directed by the health officer. In general, however, the patients seen by the nurses were those they discovered while visiting other members of the family. Of the 159 communicable disease patients, 108 were visited by the health officer and 69 by the 2 nurses. There were 77 patients placed under quarantine or isolation; the health officer visited 59 of these, and the nurses saw 23.

Most of the sanitation officer's work was related to general sanitation measures, an analysis of which has already been published (*2*). His participation in direct control measures was confined entirely to the problem of rabies. Five dogs having rabies or suspected of having rabies were reported to the health department, and in each instance the sanitation officer traced the animal and placed it under observation, or prepared the head for shipment to the State laboratory if symptoms were present.

EPIDEMIOLOGICAL INVESTIGATIONS

Epidemiological case histories, spot maps, and chronological charts were not kept by the health department. Investigations of cases were made by the health officer, but these were primarily directed

toward verification of diagnosis and obtaining specimens for laboratory analysis.

The following laboratory specimens were collected for diagnosis: Throat cultures from 8 diphtheria cases and 1 suspect, and from 1 unspecified throat condition; blood for agglutination tests on 3 typhoid fever cases, 1 typhoid suspect, and 2 typhus fever cases; blood for Wassermann tests on 1 case of syphilis and 1 suspect; blood smear for 1 malaria suspect; and spinal fluid from 1 meningitis case. Laboratory specimens to govern release of cases from isolation were obtained for diphtheria and typhoid fever cases. A total of 25 diphtheria throat cultures was collected from cases; 7 of the cultures were obtained on the first visit to the patient, the other 18 cultures were collected presumably for the purpose of determining whether the patient might be released from isolation. Of the 8 cases of diphtheria visited, 2 were cultured once, and from 2 to 8 specimens were collected from the other 6. Fifteen diphtheria contacts provided 25 cultures. One stool specimen was collected from each of 5 typhoid fever cases. No laboratory specimens were collected from 2 typhoid fever cases ending in fatalities.

Diagnosis frequently involved consultation service to the attending physician, this service being rendered in 18 instances. Assistance was obtained from the epidemiologist of the State health department on 5 occasions for the diagnosis of cases reported as poliomyelitis, meningitis, typhus fever, and smallpox. Attempts to locate the source of infection were made usually in connection with diphtheria. Child contacts of 4 cases were examined and cultures taken. A healthy carrier was found for each of 2 cases. The source of infection was also sought for a case of typhoid fever in a family group which had experienced this disease. Inspections were made of the water supply and excreta disposal facilities at each household having a case of typhoid fever. Children of 2 families known to have been in contact with scarlet fever were investigated and placed under quarantine.

VISITS

Return visits were made either by the health officer or nurse to all households having patients placed under quarantine or isolation, except 5, 1 with a case of diphtheria, 1 with a case of measles, and 3 with patients quarantined for scarlet fever. All cases of communicable disease subjected to health department isolation regulations received return visits except 4; the average number of visits to cases of this type was 2.1, and to cases of diseases which received the special attention of the health department, i. e., cases of diphtheria, meningitis, poliomyelitis, scarlet fever, and typhoid fever, an average of 2.8 visits was made. Diphtheria and typhoid fever cases received

an average of 3.6 visits. The average for all cases was 2 1; but if the minor skin conditions, such as scabies and impetigo, are excluded, the average number of visits was 2.3. The maximum number of visits made to a case was to a patient with diphtheria who received 8 calls.

Approximately 44 percent of all communicable disease cases seen by health department workers received but 1 visit, 29 percent 2 visits, 12 percent 3 visits, and 14 percent 4 or more visits. A total of 2?5 visits was made to the 97 cases and 120 visits to 62 contacts and suspects.

The interval between first and last visits to quarantined households which received more than 1 visit varied from 2 to 39 days, with a median of 10 days. All intervals were 21 days or less except for three households. Two of these had diphtheria carriers with 34- and 39-day intervals between first contact and last. The third household was one in which there developed a secondary case of scarlet fever on the sixteenth day of quarantine; the final visit occurred 38 days following the initial one. The last visit was often made a few days prior to the termination of quarantine and was usually for the purpose of determining the condition of the patient. However, in 2 instances where fatalities occurred, instructions regarding terminal disinfection were specifically mentioned as the purpose of the last visit. The health department nurses were encouraged to give general advice and instruction in communicable disease households regarding concurrent disinfection, but demonstrations of isolation technique were not given so far as the records show. Visits were made to arrange for active immunization of contacts and neighbors in connection with cases of typhoid fever in 5 households and in 1 household having diphtheria. For many visits the services rendered were limited to general instruction regarding quarantine and isolation. Sixty visits, however, were in connection with medical care of patients, 20 being directed toward obtaining medical care for patients without an attendant, while 40 involved carrying out instructions given by the family doctor.

IMMUNIZATION

From the viewpoint of the number of individuals served, immunization against diptheria, smallpox, and typhoid fever comprised the principal part of the communicable disease control program.

PERFORMANCE DURING STUDY PERIOD

A total of 3,391 persons was served by the health department in the interest of immunization, including tests for immunity, during the 8 months under study. Certain of these individuals received

more than one type of immunization service and are counted accordingly in table 7, which shows the number of individuals receiving each type of service. Diphtheria toxoid was given to 662 persons; the Schick test was given to 2,664; anti-typhoid-fever inoculation was given to 168 individuals, but the dosage to 57 was incomplete; and smallpox vaccine was given to 1,030 persons. Both the health officer and nurse participated in this work, 96 percent of which was done in schools.

TABLE 7.—*Total immunization service and number of services per 1,000 individuals by the Brunswick-Greensville health department staff in an 8-month period*

Color	Population in counties	Total services[1]		Immunization services and number per 1,000							
				Schick tests		Diphtheria toxoid		Smallpox vaccine		Typhoid vaccine	
		Number	Number per 1,000	Number	Number per 1,000	Number	Number per 1,000	Number	Number per 1,000	Number	Number per 1,000
Total	33,874	4,524	133.7	2,664	78.7	662	19.6	1,030	30.4	168	5.0
White	14,233	1,410	99.1	913	64.1	246	17.3	213	15.0	38	2.7
Colored	19,621	3,114	158.7	1,751	89.4	416	21.2	817	41.6	130	6.6

[1] The total of 4,524 represents service to 3,391 individuals who in many cases received 2 or more services.

During the school year which preceded the period of this report, diphtheria immunization was emphasized. In the following school term, Schick testing was emphasized and toxoid was given to the positive reactors and to a few first grade pupils who had not been treated previously; consequently, most of the diphtheria control service appears in the form of Schick testing. Those Schick tested were almost entirely confined to the school-age group.

Table 8 lists the estimated population in certain age groups with the percentage of individuals in each group that received Schick tests, diphtheria toxoid, and smallpox vaccination during the 8-month period of the study. Among the school-age group approximately 27 percent received a Schick test, 5 percent toxoid, and 10 percent smallpox vaccination. Among the preschool children about 2 percent were Schick tested, 3 percent given toxoid, and 0.7 percent vaccinated against smallpox. Diphtheria toxoid was given to approximately 4 percent of the infants, but no smallpox vaccinations were recorded in this age group. No attempt was made to Schick test infants.

TABLE 8.—Percentage of persons in certain age groups given [illegible] immunization services by the Brunswick-Greensville health department [illegible] period

Age group	Population [illegible]	Percent [illegible]: [illegible] tests	Percent [illegible]: Diphtheria [illegible]	Percent [illegible]: S[illegible]
Total	[illegible]	7.[illegible]	2.0	3.0
Under [illegible]	[illegible]	0	3.[illegible]	0
[illegible] years	4,4[illegible]2	1.8	2.7	7
[illegible] years	[illegible]	[illegible]	[illegible]3	10.5
[illegible] years and over	1[illegible]2	0	0	0

PERFORMANCE IN OTHER YEARS AND IN OTHER AREAS

Because of the chronology of the studies in the Brunswick-Greensville area, we have in effect a measure of the amount of immunization done during 2 previous years, one covered by nursing records (*4*) and the other by the family survey (*3*), both of which preceded the 8 months covering the analysis of the work of the department as a whole. Although the schedules for a few of the surveyed families cover a period extending into the nursing study year, the 2 sources of information provide data which essentially portray performance for 2 different years. It is emphasized that the immunization rates for the nursing year are based on a record of health department activities in which the nurses participated, whereas those for the survey year represent service only insofar as the household informant was able to recall that it had been received by members of the family. While the person interviewed by the family canvasser may have failed to remember part of the immunization service received by members of the household, it is believed that the picture presented in each instance describes what may be regarded as approximately the total service rendered. The immunization rates per 1,000 individuals for the 2 years are presented in table 9. The survey period perhaps represents a more normal year than that covered by the nursing records in that there was no special program of immunization being carried on during that period, while during the year of the nursing records a diphtheria prevention campaign was conducted by the health department. It may be seen that the total immunization rate was higher for the nursing year, 137, than for the survey period, 89.

TABLE 9.—*Immunization rates against certain communicable diseases in Brunswick and Greensville Counties for two 12-month periods. Records of nursing work and survey of families*

Type of immunization	Annual immunization rate per 1,000 individuals against specified disease					
	Nursing records			Family survey		
	Total	White	Colored	Total	White	Colored
Total	136.5	110.5	155.3	89.2	98.7	82.2
Diphtheria	67.4	51.3	79.0	30.2	27.0	32.4
Typhoid fever	28.4	43.2	17.6	42.5	48.5	38.2
Smallpox	40.7	16.0	58.7	16.5	23.2	11.6

The immunization rate for white individuals was 99 for the survey period and 110 for the nursing year, while for the colored population the rates were 82 for the former and 155 for the latter period, indicating a shift of emphasis on immunization in the nursing year from white to colored individuals. Immunization rates against the different diseases considered show that more than twice as many individuals were immunized against diphtheria and smallpox in the nursing year as in the survey period, while the typhoid immunization rate was higher during the survey year.

Data are available from which annual rates may be computed to express the amount of immunization done in counties in different parts of the United States. These data include the number of immunizations done (*a*) in rural areas of the United States studied by the Committee on the Costs of Medical Care;[3] (*b*) in Rutherford County, Tenn. (*8*); and (*c*) in 62 organized counties of 6 South Atlantic or East South Central States where demonstration projects on rural health were conducted by State and local health authorities in cooperation with the United States Public Health Service (*9*). Immunization rates computed for the foregoing areas are given in table 10. The periods covered by the rates antedate the time at which data were collected for Brunswick and Greensville Counties, but they are the nearest for which comparable figures could be found. It is recognized that there may be differences in definitions of immunizations and in the method by which the data were collected. The table shows that immunization rates for Brunswick and Greensville Counties exceeded those for other sections except Rutherford County, which had a much larger health department staff. The 62 counties in the South Atlantic and East South Central groups of States were served for the most part by organizations having relatively small staffs, while the areas in which the rural families studied by the Committee

[3] Unpublished data for rural families collected by the Committee on the Costs of Medical Care supplied by the Office of Statistical Investigations of the United States Public Health Service.

on the Costs of Medical Care resided may or may not have been served by county health departments.

TABLE 10.—*Immunization rates against certain communicable diseases in Brunswick and Greensville Counties, Va., and certain other population groups in the United States*

	Immunization rates per 1,000 individuals			
	Total	Smallpox	Diphtheria	Typhoid fever
Rutherford County, Tenn [1]	196	61	44	91
Brunswick and Greensville Counties, Va [2]	113	29	34	36
62 organized counties in 6 States in the South Atlantic and East South Central States [3]	106	26	22	58
Rural families [4]	42	26	13	3

[1] Average annual immunization rates for years 1927–28.
[2] Average annual immunization rates for survey and nursing study years.
[3] Average annual immunization rates for fiscal years 1928–29, 1929–30.
[4] Rural families studied by the Committee on the Costs of Medical Care.

The health department rendered most of the immunization service in Brunswick and Greensville Counties. Only 39 immunizations, or 8 percent of those reported in the sample of families, were done by private physicians. Furthermore, a study of individuals receiving immunization service from private physicians revealed that 11 of these 39 immunizations were typhoid fever immunizations performed by physicians to members of their own families. Six diphtheria immunizations by private physicians were reported; these were in a home where there had been 2 cases of diphtheria. This would indicate that immunization as a preventive measure in the general population was largely an activity of the local health department.

IMMUNITY STATUS

Information regarding certain immunization services received at any time by individuals under 16 years of age was obtained from the survey of 1,009 families. This information is used to provide an index of the immunity status of the population, although it is recognized that in many instances the service may not have produced immunity, also that an immunity may have developed in some without any service having been rendered.

It was found that approximately 55 percent of the individuals under 16 years of age in both counties had been vaccinated at some time against smallpox. Slightly less than 10 percent of those in Brunswick County and 20 percent of those in Greensville County had received typhoid immunizations. A somewhat higher percentage had received diphtheria immunizations in Brunswick County, the percentage being 49 in that county and 42 in Greensville. The disease incidence as measured by reported deaths showed typhoid fever to be a problem in Greensville County particularly, while

diphtheria was especially important as a problem in Brunswick County. The figures on immunity status suggest that special emphasis had been placed by the health department on the immunization of individuals in areas where the disease was most prevalent.

The percentages of white and colored individuals in certain age groups having had immunizing treatments against smallpox, typhoid fever, and diphtheria are given in table 11. It may be seen that higher percentages of white than colored reported treatment. With the exception of diphtheria immunizations, few treatments were reported as given to individuals under 6 years of age. Nearly 90 percent of the white children of school age (6–15 years) and about 80 percent of the colored had been vaccinated against smallpox, while 27 percent of the white and 13 percent of the colored had received typhoid immunizations. Diphtheria immunizations had been given to 32 percent of the white preschool children (under 6 years of age) and to about 10 percent of the colored in the same age group, while in the school age group nearly 70 percent of the white children and about 55 percent of the colored had received this protective treatment.

TABLE 11.—*Percentage of persons in surveyed sample of families reported as having been immunized at some time against certain communicable diseases in Brunswick and Greensville Counties*

Age group	Color	Population	Percent immunized against specified disease		
			Smallpox	Typhoid	Diphtheria
Under 6 years	White	335	1.5	6.4	32.5
	Colored	472	2.6	1.9	9.7
6 to 15 years	White	621	89.4	26.8	68.6
	Colored	869	79.4	12.7	55.4

The relatively higher percentage of white than colored individuals under 16 years of age having been immunized at some time against smallpox, typhoid fever, and diphtheria shows that early immunization programs were particularly active among white children. That this emphasis subsequently changed to the colored is indicated by data already presented. During the survey year the immunization rate for colored exceeded that for white children for diphtheria; during the nursing year it was higher for both diphtheria and smallpox; while for the analysis of communicable disease activities for the 8 months covered by this paper, it was higher for all three diseases, diphtheria, typhoid fever, and smallpox.

The Committee on Medical Care for Children of the White House Conference on Child Health and Protection (*10*) found 7 percent of the preschool children in the rural areas included in their survey had received smallpox vaccinations. In Brunswick and Greensville

Counties the percentages vaccinated in this age group for both white and colored children were far below the findings by the committee mentioned. The committee further found that 18 percent of the preschool children in their sample had been immunized against diphtheria. The performance in the Brunswick-Greensville area for the group of white children was 32 percent, which is considerably better than was found by the committee, but the percentage of colored children immunized in this age group was only 9 percent. The committee's report points out that "there is a strong presumption at least that the rural results are somewhat more favorable than would be the case if the selection of families had been purely on a random basis." In view of this statement, perhaps the performance in Brunswick and Greensville Counties was above the average for the rural part of the United States. It should be noted, however, that Brunswick and Greensville Counties were within the jurisdiction of a full-time health department in operation for a number of years and devoting a large part of its energies to an immunization program.

As a final comparison the percentage of children of school age in Brunswick and Greensville Counties who had been immunized is compared in table 12 with that reported for Rutherford County, Tenn. (*8*), for the rural part of Clarke County, Ga. (*11*), for Marion County, Oreg. (*12*), and Cattaraugus County, N. Y. (*13*). In each of these areas an intensive health demonstration had been carried on for a number of years. It should be mentioned that the basis upon which the percentages are computed may not be strictly comparable for all the areas. There had been little or no typhoid immunization in Marion County, Oreg., or in Cattaraugus County, N. Y., as the disease was not a major problem in those areas. No records on typhoid immunizations were available for Clarke County, Ga. On the basis of these figures it may be noted that the immunity status of the school population in Brunswick and Greensville Counties compares very favorably with the immunity status in the demonstration areas.

TABLE 12.—*Percentage of school children reported as having been immunized against certain communicable diseases at some time previous to date of inquiry in Brunswick and Greensville Counties and in certain organized counties in the United States*

	Percent of school children immunized in specified areas		
	Smallpox	Typhoid fever	Diphtheria
Brunswick and Greensville Counties	53 6	18 7	61.1
Cattaraugus County, N Y	15 0	(1)	65 1
Child health demonstration areas			
Rutherford County, Tenn	75 5	47 5	55 1
Rural part Clarke County, Ga	67 0	(1)	55 0
Marion County, Oreg.	57 0	(1)	61 0

[1] No figures available.

SUMMARY

An analysis has been presented of the activities of a rural health department in relation to communicable disease control.

Information obtained from a surveyed sample of one-sixth of the population on the incidence of all notifiable acute communicable diseases for a 12-month period compared with reported cases to the State for the calendar year most nearly approximating the period of the survey showed that the number of cases reported to the State was only about 10 percent of the total cases estimated to have occurred in the area. For diphtheria, meningitis, poliomyelitis, scarlet fever, and typhoid fever, for which diseases control measures were emphasized by the local health department, the number of cases reported to the State was about 45 percent of the number estimated to have occurred.

In an 8-month period for which the activities of the health department were analyzed, members of the staff visited 68 percent of the reported cases of notifiable disease, exclusive of pneumonia and influenza. In the same period they visited 94 percent of the cases of diphtheria, meningitis, poliomyelitis, scarlet fever, and typhoid fever that were reported to the health department. Cases were also visited which were not reported to the State so that the total number of cases visited exceeded the number reported from the area, provided influenza and pneumonia are excluded from consideration. Health department workers visited 159 cases, contacts, or suspects of notifiable diseases during the 8-month period; 69 of these were visited by the health department nurse and 108 by the health officer.

From the standpoint of number of persons served, most of the control services during the 8-month period consisted of Schick tests and immunization against diphtheria, smallpox, and typhoid fever. The immunization rates per 1,000 persons were 19.6 for diphtheria, 30.4 for smallpox, and 5.0 for typhoid fever, while 78.7 Schick tests were given per 1,000 persons. The bulk of the work was done in the school-age group; 26.8 percent of children from 6–15 years of age were Schick tested, about 5 percent received diphtheria immunization, and 10 percent were vaccinated against smallpox. Immunization rates for two preceding 12-month periods indicated that even proportionately more immunization work was done for the 2 years prior to the 8-month period here analyzed. The immunity status of individuals under 16 years of age at the time of the family survey which antedated the period of the 8-month analysis by approximately 2 years indicated that a high percentage of school children at that time had already received immunizations, especially against diphtheria and smallpox. With one exception the percentages of children from 6 to 15 years of age immunized against diphtheria and smallpox

were higher in the Brunswick-Greensville area than in any one of 4 demonstration areas for which data are presented.

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PARAGUAY CREATES NATIONAL MINISTRY OF HEALTH

On June 17, 1936, the Provisional President of the Republic of Paraguay, under the authority of a plebiscitary decree, created a National Ministry of Public Health, with Dr. Pedro Duarte Ortellado in charge. The Ministry carries a portfolio of equal rank with the other cabinet Ministries established by the Constitution of 1870. The decree states that the new Ministry is established in view of the fact "That the efficacious defense of the health of the people is one of the first duties of the state * * * to the end of aiding the well-being of the inhabitants of the Republic and the increase of the economic power of the Nation", and "That the organization of sanitary services ought to respond to a technical and scientific administration of the hierarchy and authority necessary to comply with the far-reaching commission that it enjoys."

HISTORY OF COUNTY HEALTH ORGANIZATIONS IN THE UNITED STATES, 1908–33

The United States Public Health Service has recently published a report on the history and development of county health organizations in the United States[1] All persons interested in county health departments should welcome the appearance of this bulletin, which is the first comprehensive account of a development in public health administration that is perhaps the most significant of the present century.

The factual material presented in the bulletin deals very largely with personnel and budget. With these objective data the authors, Dr John A. Ferrell and Pauline A. Mead, have outlined the experience of the health department in each county which has established an organized health service.

Perhaps the most significant fact in this history of county health departments is that the movement began in counties widely separated from each other geographically and presenting different problems. The suburban problems around Louisville, Ky., were approached from a county unit point of view for the first time in 1908. Yakima County, Wash , established a health department in 1911 for the purpose of controlling typhoid fever, which was conveyed by polluted drinking water taken from the irrigation ditches. During the same year the schools of Guilford, N. C., induced the county authorities to make county-wide provision for the health of school children. Shortly thereafter, Robeson County, N. C., adopted the county health department form of organization to combat hookworm infestation. From these beginnings the movement extended to all sections of the United States.

During the period under consideration (1908–33), 754 counties established health departments conforming to the definition used in this bulletin. These counties are distributed over 38 States. At the close of 1933 the service was being maintained in 524 counties. The largest number of failures occurred in 1932 and 1933, years of greatest financial distress.

Prior to 1916 the counties and contained cities financed the health departments and have continued to bear the largest share of the expense. Since that year, subsidy has been an integral part of the supporting financial structure. The States as a group rank next as a source of funds. The United States Public Health Service and the Rockefeller Foundation are, from the standpoint of grants in aid, the most important extra-State agencies.

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[1] History of county health organizations in the United States, 1908–33 Compiled by John A Ferrell, M D, Dr P H, associate director, and Pauline A Mead, B Sc in hygiene, statistician, international health division of the Rockefeller Foundation Public Health Bulletin No 222 Government Printing Office, Washington, D C. 469 pp Price, 50 cents

Practical health officers, as well as students of health administration, will be interested especially in the detailed figures regarding personnel and budget. These are given in the bulletin for every county during each year organized health service was maintained. Financial data also are summarized by States and by agencies contributing to the budgets. The more significant trends in financial structure and in patterns of personnel are illustrated graphically.

It is fortunate indeed that the basic records supporting this splendid history of county health organization should have been preserved. Another fortuitous circumstance is to be found in the fact that the two persons most prominently identified with the movement from its beginning should have participated in the preparation of the bulletin. Dr. John A. Ferrell, the senior author, contributes his experience, which is based on personal contact with the movement from its very inception. Dr. L. L. Lumsden, the other pioneer in county health work, supplies one chapter on the early history of typhoid fever control measures in rural areas. These two sanitarians, one seeking to eradicate hookworm disease and the other concerned with typhoid fever control measures, evolved in the county health department not only a mechanism for preventing these diseases but one for supplying other types of health service to rural areas.

DEATHS DURING WEEK ENDED JULY 4, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 4, 1936	Corresponding week, 1935
Data from 86 large cities of the United States		
Total deaths	7,543	7,323
Deaths per 1,000 population, annual basis	10.5	10.2
Deaths under 1 year of age	477	481
Deaths under 1 year of age per 1,000 estimated live births	43	44
Deaths per 1,000 population, annual basis, first 27 weeks of year	12.8	12.1
Data from industrial insurance companies		
Policies in force	68,517,742	67,920,275
Number of death claims	12,007	9,311
Death claims per 1,000 policies in force, annual rate	9.2	7.1
Death claims per 1,000 policies, first 27 weeks of year, annual rate	10.5	10.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 11, 1936, and July 13, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 11, 1936, and July 13, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935
New England States:								
Maine	-------	1	-------	-------	131	211	0	1
New Hampshire	-------	-------	-------	-------	3	1	0	0
Vermont	-------	-------	-------	-------	12	37	0	0
Massachusetts	12	9	-------	-------	377	195	0	8
Rhode Island	1	2	-------	-------	17	123	0	0
Connecticut	1	9	-------	1	53	167	1	0
Middle Atlantic States:								
New York	40	29	[1] 2	[1] 3	1,066	1,382	11	10
New Jersey	7	9	9	2	321	557	3	2
Pennsylvania [2]	15	17	-------	-------	287	514	3	1
East North Central States:								
Ohio	13	16	7	7	54	727	3	10
Indiana	3	9	6	8	3	27	0	2
Illinois [2]	41	26	24	18	21	414	5	12
Michigan	15	11	1	-------	34	607	2	3
Wisconsin	3	3	4	17	91	730	2	4
West North Central States:								
Minnesota	2	4	11	1	53	68	0	1
Iowa	5	4	-------	-------	2	15	0	2
Missouri	6	19	27	27	16	35	3	1
North Dakota	-------	1	-------	9	-------	8	0	1
South Dakota	2	6	-------	-------	3	8	0	0
Nebraska	6	2	-------	-------	3	25	1	0
Kansas	12	6	4	8	10	51	1	2
South Atlantic States:								
Delaware	1	2	-------	-------	-------	10	0	0
Maryland [2] [3]	3	10	1	-------	124	17	3	4
District of Columbia	2	15	-------	-------	51	10	2	1
Virginia [3]	7	6	-------	-------	60	60	2	5
West Virginia	1	12	4	16	20	28	5	1
North Carolina	13	13	1	-------	12	22	7	2
South Carolina	3	-------	36	35	5	3	0	1
Georgia [4]	5	9	-------	-------	-------	-------	2	0
Florida	2	3	-------	1	4	2	4	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 11, 1936, and July 13, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935
East South Central States:								
Kentucky	4	5	1	4	7	40	4	1
Tennessee	2	3	9	5	8	4	3	2
Alabama [1]	11	10	2	15	2	10	2	0
Mississippi [3]	8	2					0	1
West South Central States:								
Arkansas	6	1	4	3		4	1	2
Louisiana	7	25	18	10	9	15	0	1
Oklahoma [5]	1	3	7	5		3	1	0
Texas [1]	11	20	67	6	76	16	3	2
Mountain States:								
Montana		6	1	2	2	35	0	0
Idaho [4]	1		1		5	3	0	0
Wyoming					3	2	0	0
Colorado [1]	1	3			12	20	0	3
New Mexico		2	2		5	3	0	2
Arizona	1	1	8		37	4	0	0
Utah [4]	1				22		0	0
Pacific States								
Washington		1			92	116	0	0
Oregon		1	1	4	15	41	1	1
California	25	20	116	25	323	418	4	3
Total	300	365	371	232	3,451	6,896	79	87
First 28 weeks of year	13,685	16,243	140,775	102,780	262,049	682,857	5,615	3,795

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935
New England States:								
Maine	1	0	17	8	0	0	1	1
New Hampshire	0	0	3	8	0	0	0	0
Vermont	3	0	7	2	0	0	1	1
Massachusetts	1	3	66	74	0	0	0	4
Rhode Island	0	1	10	6	0	0	0	1
Connecticut	0	2	10	33	0	0	4	0
Middle Atlantic States:								
New York	4	18	225	228	0	0	8	16
New Jersey	1	4	90	57	0	0	6	1
Pennsylvania [4]	0	0	121	144	0	0	3	68
East North Central States:								
Ohio	1	0	40	120	0	0	12	14
Indiana	0	0	28	26	1	2	3	1
Illinois [2]	8	5	183	213	13	0	12	24
Michigan	1	1	129	61	0	1	3	11
Wisconsin	0	2	115	142	21	16	4	1
West North Central States:								
Minnesota	0	0	58	72	4	6	0	47
Iowa	0	0	46	15	5	5	2	1
Missouri	0	1	37	19	11	0	11	21
North Dakota	1	0	3	10	1	0	0	0
South Dakota	0	0	2	2	5	9	0	0
Nebraska	0	0	14	3	3	7	1	1
Kansas	2	0	63	27	5	9	5	4
South Atlantic States:								
Delaware	0	0	2		0	0	0	0
Maryland [2 3]	1	0	18	40	0	0	4	12
District of Columbia	0	3	1	7	0	0	0	1
Virginia [2]	0	45	14	6	0	1	14	17
West Virginia	2	0	17	12	0	0	5	21
North Carolina	2	52	25	15	0	0	18	43
South Carolina	1	3	4	2	0	0	16	33
Georgia [4]	1	0	5	1	0	0	39	37
Florida	0	0	0		0	0	0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 11, 1936, and July 13, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935	Week ended July 11, 1936	Week ended July 13, 1935
East South Central States:								
Kentucky	1	0	10	19	0	0	17	31
Tennessee	12	11	4	10	0	0	20	42
Alabama [4]	82	6	14	11	0	0	26	28
Mississippi [3]	0	1	5	--------	0	0	30	6
West South Central States:								
Arkansas	0	0	1	11	0	0	22	23
Louisiana	1	3	6	3	0	0	19	25
Oklahoma [5]	0	0	5	11	0	1	13	14
Texas [4]	0	1	8	11	0	0	29	28
Mountain States:								
Montana	0	0	31	2	12	1	2	1
Idaho [2]	0	0	3	2	2	0	0	4
Wyoming	0	0	11	5	14	3	0	0
Colorado [4]	0	0	21	42	0	3	0	2
New Mexico	0	0	10	8	0	0	5	11
Arizona	0	0	6	7	0	0	0	7
Utah [3]	0	0	12	23	1	0	0	0
Pacific States:								
Washington	1	0	14	30	4	29	9	1
Oregon	0	0	9	19	1	9	4	1
California	8	29	125	80	0	3	11	5
Total	135	191	1,648	1,650	103	105	370	614
First 28 weeks of year	704	1,372	178,532	175,080	5,665	5,081	4,276	5,623

1 New York City only.
2 Rocky Mountain spotted fever, week ended July 11, 1936, 11 cases, as follows: Pennsylvania, 2; Illinois, 2; Maryland, 4; Virginia, 2; Idaho, 1.
3 Week ended earlier than Saturday.
4 Typhus fever, week ended July 11, 1936, 28 cases, as follows: Georgia, 16; Alabama, 6; Texas, 5; Colorado, 1.
5 Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1936										
Colorado	2	20	1	--------	142	--------	0	383	12	5
New Hampshire	--------	--------	--------	--------	--------	--------	0	35	0	2
June 1936										
Arizona	2	13	74	12	358	--------	0	50	0	11
Delaware	1	4	--------	1	52	--------	0	6	0	1
Indiana	6	27	33	--------	40	--------	0	222	15	16
Maine	--------	3	--------	--------	1,830	--------	0	40	0	6
New Hampshire	--------	--------	--------	--------	--------	--------	0	23	0	0
New Mexico	3	16	11	10	164	4	1	151	--------	34
North Carolina	25	44	11	--------	135	169	4	66	2	30
Wyoming	1	1	--------	--------	9	--------	0	69	18	0

Summary of monthly reports from States—Continued

	Cases
May 1936	
Colorado:	
Actinomycosis	1
Chicken pox	156
Impetigo contagiosa	3
Mumps	318
Rocky Mountain spotted fever	6
Whooping cough	139
June 1936	
Anthrax:	
Arizona	1
Chicken pox:	
Arizona	26
Delaware	15
Indiana	67
Maine	90
New Mexico	36
North Carolina	164
Wyoming	15
Dysentery:	
Arizona	54
New Mexico (amoebic)	1
New Mexico (bacillary)	5
Epidemic encephalitis:	
Arizona	1
Food poisoning:	
New Mexico	4
June 1936—Continued	
German measles:	
Arizona	28
Delaware	18
Maine	239
New Mexico	1
North Carolina	310
Mumps:	
Arizona	186
Delaware	29
Indiana	82
Maine	305
New Mexico	81
Wyoming	14
Paratyphoid fever:	
New Mexico	1
North Carolina	2
Puerperal septicemia:	
New Mexico	1
Rabies in animals:	
Indiana	63
Rocky Mountain spotted fever:	
North Carolina	2
Wyoming	10
Septic sore throat:	
Maine	3
New Mexico	5
North Carolina	5
June 1936—Continued	
Tetanus:	
Maine	1
Trachoma:	
Arizona	23
New Mexico	1
North Carolina	1
Tularaemia:	
Wyoming	2
Typhus fever:	
North Carolina	2
Undulant fever:	
Arizona	6
Delaware	1
Indiana	2
Maine	2
North Carolina	4
Vincent's infection:	
Maine	8
Whooping cough:	
Arizona	66
Delaware	19
Indiana	119
Maine	108
New Mexico	54
North Carolina	130

HUMAN AND RODENT PLAGUE IN CALIFORNIA, IDAHO, AND UTAH

Positive bacteriological findings for plague were reported July 13 in the case of a boy bitten by a ground squirrel on June 24 near Beaver, Beaver County, Utah.

Ground squirrels, 2 from a ranch 2 miles north of Bone, Bonneville County, Utah, shot June 23, and 5 secured June 24 from a ranch 4 miles southwest of Bone, were proved plague infected. Also fleas taken June 25 and 26 from 75 squirrels on the latter ranch were found positive for plague.

The Director of Public Health of California has reported plague infection in 1 Oregon squirrel received at the laboratory on July 7 from a point 5 miles south of Pine Creek, Modoc County; also in 3 collections of fleas received at the laboratory on June 25 from places 2 miles west and 2 miles south, 8 miles north and 5 miles east, and 7 miles north and 5 miles east of Davis Creek, Modoc County. He has also reported plague infection in 5 squirrels received at the laboratory on July 2 from a place 4 miles northwest of Santa Cruz, Santa Cruz County, and in 4 collections of fleas from places 4 to 8 miles east of Watsonville, 1 collection from 4 miles west of Watsonville, 1 from Chittenden Station, and 1 from 8 miles southeast of Capitola, all in Santa Cruz County.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 4, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	--------	0	45	0	1	0	1	0	7	16
New Hampshire:											
Concord	0	--------	0	0	0	0	0	0	0	0	5
Manchester	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Nashua	0	--------	--------	0	--------	0	0	--------	0	0	--------
Vermont:											
Barre	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
Burlington	0	--------	0	0	0	0	0	0	0	3	8
Rutland	0	--------	0	3	1	0	0	0	0	0	6
Massachusetts:											
Boston	2	--------	0	117	20	18	0	9	0	52	199
Fall River	0	--------	0	2	1	4	0	0	0	0	20
Springfield	0	--------	0	1	2	1	0	1	0	2	34
Worcester	0	--------	0	27	1	9	0	1	0	6	45
Rhode Island:											
Pawtucket	0	--------	0	0	0	0	0	0	0	0	--------
Providence	0	--------	0	1	2	4	0	1	0	1	70
Connecticut:											
Bridgeport	0	--------	0	8	1	0	0	0	0	4	26
Hartford	0	--------	0	2	1	2	0	4	0	5	32
New Haven	0	--------	0	0	3	0	0	1	0	8	43
New York:											
Buffalo	1	--------	0	71	5	14	0	5	0	6	124
New York	30	--------	0	540	58	124	0	67	5	87	1,207
Rochester	0	--------	0	1	8	1	0	2	1	0	58
Syracuse	0	--------	0	31	1	4	0	2	0	13	46
New Jersey:											
Camden	0	1	1	12	1	1	0	1	0	3	36
Newark	0	--------	0	14	0	14	0	8	0	22	72
Trenton	0	--------	0	5	1	0	0	3	0	5	36
Pennsylvania:											
Philadelphia	5	1	1	100	19	42	0	28	0	49	443
Pittsburgh	7	--------	0	8	15	43	0	6	0	32	140
Reading	0	--------	0	6	1	0	0	0	0	2	22
Scranton	0	--------	--------	2	--------	0	0	--------	0	5	--------
Ohio:											
Cincinnati	5	--------	1	6	4	2	0	7	0	0	135
Cleveland	3	2	1	80	8	35	0	10	1	111	193
Columbus	0	1	1	0	2	2	0	6	0	13	69
Toledo	0	--------	0	7	0	2	0	1	1	46	48
Indiana:											
Anderson	0	--------	0	0	0	1	0	1	0	5	5
Fort Wayne	1	--------	0	0	2	2	0	0	0	0	23
Indianapolis	2	--------	0	4	6	9	0	7	0	15	97
South Bend	0	--------	0	0	0	0	0	0	0	0	17
Terre Haute	0	--------	0	2	0	1	0	0	0	0	31
Illinois:											
Alton	0	--------	0	0	0	6	0	0	0	3	5
Chicago	24	--------	0	10	37	106	0	47	0	70	679
Elgin	0	--------	0	0	1	0	0	1	0	5	9
Moline	0	--------	0	0	2	1	0	0	0	0	9
Springfield	0	--------	0	0	1	1	0	0	0	6	23
Michigan:											
Detroit	3	1	1	10	12	80	0	22	0	136	248
Flint	0	--------	0	1	2	5	0	0	0	2	26
Grand Rapids	0	--------	0	2	0	4	0	0	1	5	30
Wisconsin:											
Kenosha	0	--------	0	0	0	1	21	0	0	5	5
Milwaukee	1	--------	0	14	6	26	0	5	0	61	95
Racine	0	--------	0	0	0	2	0	0	0	0	13
Superior	0	--------	0	0	2	8	0	0	0	0	8
Minnesota:											
Duluth	0	--------	0	0	2	15	0	0	0	10	29
Minneapolis	0	--------	1	22	3	10	0	1	1	1	86
St. Paul	0	--------	0	35	0	6	0	3	1	4	55

City reports for week ended July 4, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0			0		0	0		0	1	
Davenport	0			0		4	0		0	0	
Des Moines	3			0		0	0		0	0	22
Sioux City	0			0		2	2		0	0	
Waterloo	0			1		3	0		0	0	
Missouri:											
Kansas City	3		0	0	4	12	1	6	1	1	103
St. Joseph											
St. Louis	6		0	5	6	18	0	11	2	17	242
North Dakota:											
Fargo	0		0	0	0	1	0	0	0	0	2
Minot	0		0	0	0	3	0	0	0	0	5
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	7
Nebraska:											
Omaha	2		0	1	3	2	4	0	0	2	40
Kansas:											
Lawrence	0		0	0	0	1	0	0	0	0	6
Topeka											
Wichita	0		0	1	4	3	0	0	0	1	30
Delaware:											
Wilmington	4		0	6	1	0	0	2	0	7	36
Maryland:											
Baltimore	2	1	1	131	5	11	0	11	0	81	176
Cumberland	0		0	0	0	0	0	0	0	0	10
Frederick	0		0	1	0	0	0	0	0	1	7
Dist. of Columbia:											
Washington	14		0	57	4	9	0	14	0	38	167
Virginia:											
Lynchburg	0		0	2	0	1	0	0	0	1	8
Richmond	0		0	0	2	3	0	2	0	1	63
Roanoke	0		0	1	0	0	0	0	0	0	6
West Virginia:											
Charleston	0		0	0	1	0	0	0	1	1	21
Huntington	0			0		1	0		0	0	
Wheeling	1		0	4	1	2	0	1	0	1	17
North Carolina:											
Gastonia	0		0	0	0	1	0	0	0	0	
Wilmington	0		0	0	1	0	0	0	0	0	10
Winston-Salem	0		0	0	0	1	0	1	0	0	19
South Carolina:											
Charleston	0		0	0	1	1	0	1	0	0	22
Columbia											
Florence	0		0	0	1	0	0	0	0	1	6
Greenville	0		0	1	1	0	0	0	0	0	6
Georgia:											
Atlanta	0		0	0	4	0	0	5	0	1	85
Brunswick	0		0	0	0	0	0	1	0	0	2
Savannah	0	1	1	0	1	0	0	5	1	0	29
Florida:											
Miami	0		0	0	0	0	0	1	0	7	27
Tampa	0		0	4	3	0	0	2	0	0	31
Kentucky:											
Ashland	0		0	1	2	0	0	1	1	0	18
Covington	0		0	3	4	0	0	2	0	0	12
Lexington	0		0	0	2	0	0	2	0	2	19
Tennessee:											
Knoxville	0		0	0	2	0	0	2	2	0	22
Memphis	0		2	1	2	1	0	8	1	6	85
Nashville	0		0	1	3	0	0	0	0	1	55
Alabama:											
Birmingham	0		0	1	0	1	0	3	1	2	41
Mobile	0		1	0	0	0	0	1	0	0	18
Montgomery	0	1		0		0	0		0	1	
Arkansas:											
Fort Smith											
Little Rock	0		0	0	1	0	0	4	0	0	10
Louisiana:											
Lake Charles	0		0	0	1	0	0	0	0	0	8
New Orleans	0	5	1	4	10	1	0	13	1	40	169
Shreveport	0		0	1	5	0	0	1	1	1	32

City reports for week ended July 4, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Oklahoma City	0	3	0	0	2	0	0	0	0	0	27
Texas:											
Dallas	1		0	12	5	0	0	0	0	0	46
Fort Worth	1		0	2	1	0	0	3	0	0	33
Galveston	0		1	1	1	1	0	1	0	0	13
Houston	1		0	0	3	1	0	8	0	0	64
San Antonio											
Montana:											
Billings	0		0	0	1	0	1	0	0	1	6
Great Falls	0		0	0	0	0	0	0	0	7	14
Helena	0		0	0	0	2	0	0	0	0	4
Missoula	0		0	0	1	0	0	0	0	0	13
Idaho:											
Boise	0		0	1	1	0	0	0	0	0	5
Colorado:											
Colorado Springs	0		0	0	0	4	0	1	0	1	10
Denver	2		0	7	7	6	0	3	0	36	67
Pueblo	0		0	0	0	6	0	1	0	0	6
New Mexico:											
Albuquerque	0		0	0	4	0	0	0	0	0	14
Utah:											
Salt Lake City	0		2	20	3	6	1	1	0	7	33
Nevada:											
Reno											
Washington:											
Seattle	0		1	54	4	4	0	3	0	8	94
Spokane	0		0	13	0	4	0	2	1	10	22
Tacoma	0		0	3	3	0	0	0	0	1	23
Oregon:											
Portland	0		0	2	2	2	1	2	0	10	58
Salem	0			2		0	0		0	0	
California:											
Los Angeles	8	13	0	75	14	28	0	8	0	75	274
Sacramento	0	1	1	1	1	6	0	2	1	14	19
San Francisco	0	1	0	26	4	27	0	9	0	9	131

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
New York:				Maryland:			
New York	8	4	1	Baltimore	5	3	0
New Jersey:				West Virginia:			
Newark	1	0	0	Wheeling	2	0	0
Pennsylvania:				North Carolina:			
Pittsburgh	1	0	0	Wilmington	3	2	0
Ohio:				South Carolina:			
Cleveland	1	0	0	Charleston	1	0	0
Indiana:				Kentucky:			
Indianapolis	1	1	1	Ashland	0	2	0
Illinois:				Tennessee:			
Chicago	4	3	1	Memphis	1	0	0
Elgin	1	1	0	Louisiana:			
Michigan:				Shreveport	0	2	0
Detroit	1	1	0	Texas:			
Missouri:				Galveston	1	1	0
Kansas City	0	0	1	California:			
Kansas:				Los Angeles	2	0	2
Wichita	0	0	1	Sacramento	1	0	0

Epidemic encephalitis.—Cases: Kansas City, Mo., 1.

Pellagra.—Cases: Indianapolis, 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 1; Memphis, 1; Birmingham, 1; Los Angeles, 1.

Rabies in man.—Deaths: Chicago, 1.

Typhus fever.—Cases: Montgomery, 3.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended June 27, 1936.—During the 2 weeks ended June 27, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	1	1		1		2	6
Chicken pox		6		144	342	54	55	14	35	650
Diphtheria		1	1	31	8	8	3			52
Dysentery						1				1
Erysipelas				4	5	6	2	1	3	21
Influenza		15			1		5		24	45
Lethargic encephalitis						1				1
Measles		22	7	348	1, 221	319	76	179	176	2, 318
Mumps		1			494	20	35	23	92	665
Paratyphoid fever		9						1		10
Pneumonia		4			36		12		7	59
Poliomyelitis				1	1					2
Scarlet fever		18	1	122	202	136	38	82	23	712
Tuberculosis	2	25	40	129	107	24	4	6	37	374
Typhoid fever	1		1	24	5		1	4	4	40
Undulant fever					15	1	1			17
Whooping cough		19		121	216	11	12	16	68	463

CUBA

Habana—Communicable diseases—4 weeks ended July 4, 1936.—During the 4 weeks ended July 4, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	6	1	Scarlet fever	1	
Malaria	[1] 44		Tuberculosis	32	3
Poliomyelitis	[1] 5		Typhoid fever	[1] 69	5

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended June 27, 1936.—During the 4 weeks ended June 27, 1936, cases of certain notifiable diseases were reported in the provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	2		1	4	1	9
Chicken pox		7		7		2	16
Diphtheria		2		1	3	4	10
Leprosy		1					1
Malaria	85	45	53	172	75	560	990
Measles	3		2	11	10	5	31
Poliomyelitis		3	1	5			9
Scarlet fever		1				1	2
Tuberculosis	13	3	9	36	14	34	109
Typhoid fever	7	58	32	29	9	41	176

EGYPT

Infectious diseases—Third quarter 1935.—During the third quarter of 1935, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	5	1	Plague	3	3
Cerebrospinal fever	23	22	Poliomyelitis	5	
Chicken pox	41	3	Puerperal septicemia	129	98
Diphtheria	636	300	Rabies		3
Dysentery	911	187	Scarlet fever	11	1
Epidemic jaundice	5	5	Smallpox	1	
Erysipelas	865	212	Tetanus	133	91
Influenza	2,298	54	Tuberculosis (pulmonary)	1,331	609
Leprosy	54	14	Typhoid fever	1,767	422
Lethargic encephalitis		3	Typhus fever	159	49
Malaria	8,018	18	Undulant fever	2	2
Measles	1,703	684	Whooping cough	270	28
Mumps	180	8			

Vital statistics—Third quarter 1935.—Following are vital statistics for the third quarter of 1935 in all places in Egypt having a health bureau:

Population	4,603,100	Deaths per 1,000 population	32.1
Live births	46,751	Deaths from diarrhea and enteritis under 2 years of age	12,815
Births per 1,000 population	40.6	Infant mortality per 1,000 live births	261
Stillbirths	906		
Total deaths (excluding stillbirths)	36,913		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 26, 1936, pages 858–870. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 31, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

India—Calcutta.—During the week ended July 4, 1936, 1 suspected case of plague was reported at Calcutta, India.

United States.—A report of plague infection in Modoc and Santa Cruz Counties, Calif., and Bonneville County, Idaho, and of human

plague in Utah, appears on page 1019 of this issue of the PUBLIC HEALTH REPORTS.

Smallpox

Gambia (Upper).—During the week ended July 4, 1936, 38 cases of smallpox were reported in Gambia (Upper).

Mexico.—During the month of April 1936 smallpox was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 4 cases, 1 death; Guadalajara, Jalisco State, 39 cases, 34 deaths; Mexico State, 6 cases; Mexico, D. F., 13 cases, 5 deaths; Puebla, Puebla State, 1 case; Sonora State, 1 case.

Typhus Fever

Irish Free State—Galway County—Bothar Buidhe—Carraroe.—During the week ended June 27, 1936, 1 case of typhus fever was reported at Carraroe, Bothar Buidhe, Galway County, Irish Free State.

Mexico.—During the month of April 1936 typhus fever was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 5 cases, 4 deaths; Guanajuato State, 2 cases, 2 deaths; Mexico State, 6 cases; Mexico, D. F., 40 cases, 20 deaths; Puebla, Puebla State, 3 cases, 1 death; San Luis Potosi, San Luis Potosi State, 3 cases.

Yellow Fever

Brazil.—Yellow fever has been reported in Brazil as follows: Fructal, Minas Geraes State, 1 case, 1 death, June 1, 1936; Amparo, Sao Paulo State, 1 case, 1 death, June 6, 1936.

Sudan (French)—Kayes.—On July 4, 1936, 1 suspected case of yellow fever with 1 death was reported at Kayes, French Sudan.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

June 14–July 11, 1936

Poliomyelitis.—During the 4 weeks ended July 11 there were 134 cases of poliomyelitis reported in Alabama. The outbreak involved about 10 counties in the northwestern part of the State and has spread into adjoining counties in Alabama as well as into 3 counties in Tennessee. For the 4 weeks Tennessee reported 13 cases.

For the country as a whole the current incidence (256 cases) was about 40 percent of that for the corresponding period in 1935 and about 20 percent of the incidence (1,309 cases) in 1934. In 1935 an epidemic that started in North Carolina was in progress at this time and in 1934 an epidemic beginning in California in May reached its peak during this period. In 1933, 1932, and 1931 the cases for this period totaled 188, 173, and 291, respectively.

An increase in poliomyelitis is usually expected at this season of the year, but no unusual prevalence was reported from any section of the country except the East South Central. The incidence in the New England and Middle Atlantic regions was somewhat below the expectancy, and in other regions it was about on a level with normal preceding years.

Meningococcus meningitis.—The number of cases of meningococcus meningitis reported for the current 4-week period was 362, which was about 10 percent lower than the figure for the corresponding period in 1935. For this period in the 3 preceding years, 134, 145, and 141 were reported, respectively. While the figure for the country as a whole did not reach that for the corresponding period in 1929, the South Atlantic (106 cases) and South Central regions (64 cases) reported the highest incidence in the 8 years for which these data are available. In all other regions the current incidence fell below that of last year but was considerably above that for the corresponding period in the 3 preceding years. The general tendency all over the country is toward the seasonal low level, which is usually reached during the late summer. A few States, however, in which the dis-

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The number of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48, scarlet fever, 48, influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

ease has been most prevalent are still reporting a rather large number of cases. For the 4 weeks under review, New York reported 46 cases; Virginia, 29; North Carolina, 24; Maryland, 15; Kentucky, 25; and Tennessee, 13.

Smallpox.—For the 4 weeks ended July 11 the reported cases of smallpox totaled 534, as against 552, 204, and 424 for the corresponding period in the years 1935, 1934, and 1933, respectively. The high incidence was still confined to the North Central and Mountain regions. States reporting an unusually high incidence were Montana (99 cases), Illinois (69), Nebraska (46), Minnesota (45), Wisconsin (40), Missouri (28). Two cases were reported from New York (Middle Atlantic region), and in the South Atlantic and South Central regions the incidence remained somewhat below the seasonal expectancy.

Scarlet fever.—The number of cases of scarlet fever dropped from 18,493 for the 4 weeks ended June 13 to 9,638 for the current 4-week period. The current incidence fell slightly below the unusually high incidence of 1935, but it was about 40 percent above the average for the 6 preceding years. In the West North Central and Mountain and Pacific regions the incidence still remained the highest in recent years. The New England and Middle Atlantic States reported approximately the same incidence as last year, while in the East North Central, South Atlantic, and South Central regions the incidence was somewhat below the seasonal expectancy.

Measles.—The current incidence of measles (24,029 cases) compared very favorably with that for the corresponding periods in the normal measles years of 1929 to 1933, inclusive. For this period in 1935 and 1934 the numbers of cases totaled 41,474 and 34,925, respectively. In the Mountain and Pacific regions the incidence was somewhat above the average for recent years, but in all other regions it stood at about the normal seasonal level.

Diphtheria.—The number of cases of diphtheria reported for the 4 weeks ended July 11 was 1,232, about 80 percent of the number reported for the corresponding period in 1935. For the country as a whole as well as for each geographic region, except the South Atlantic, the current incidence was the lowest in the 8 years for which these data are available. The disease was less prevalent than last year in the South Atlantic region but stood at about the average for preceding years.

Influenza.—For the country as a whole the influenza incidence (2,691 cases) was considerably above the level of preceding years. The high incidence, however, has been mostly confined to the South Central and Mountain and Pacific regions. While the number of cases (1,641) in the Mountain and Pacific regions was not especially large, it was about 12 times the number reported for the correspond-

ing period in each of the 6 preceding years. In the North Central regions the incidence fell below that of last year, while in the South Atlantic region it stood at about last year's level. The New England and Middle Atlantic regions reported about the normal seasonal incidence.

Typhoid fever.—The expected seasonal increase of typhoid fever was apparent in practically all sections of the country, but the total number of cases (1,240) was considerably below the figures for the corresponding period in preceding years. The Pacific region reported 103 cases, as compared with 36 for this period in 1935, but in all other regions the current incidence was the lowest in recent years.

Mortality, all causes.—The average mortality rate from all causes in large cities for the 4 weeks ended July 11, as reported by the Bureau of the Census, was 11.0 per 1,000 inhabitants (annual basis). The rates for the separate weeks were 10.8, 10.9, 10.5, and 11.9, respectively. An examination of the data for individual cities indicates that the high temperatures that prevailed, especially in the Middle West, were no doubt mostly responsible for the sharp rise in the death rate during the last week of the period. A number of cities reported death rates for this week that were considerably above the normal expectancy.

For the corresponding period in the years 1935, 1934, and 1933 the average rates were 10.6, 10.5, and 9.9, respectively.

THE HISTORY OF LEPROSY IN LOUISIANA [1]

By O. E. Denney, *Surgeon, United States Public Health Service, Medical Officer in Charge, National Leprosarium, Carville, La.*[2]

The title of this paper presupposes the presentation of historical facts in an orderly and chronological manner. Several factors operate to prevent such a procedure. First, and most regrettably, there is a paucity of available medical data concerning the sources and dates of the first cases of leprosy in this State; second, there has been, even in present times, some confusion regarding the diagnosis of any but typical cases; and third, there has been in Louisiana, as elsewhere throughout the world since Biblical times, an ever present and frequently successful attempt to hide individual cases from view and record.

The early history of leprosy in Louisiana is inextricably mingled with the early romance of the State; and it appears that the early inhabitants received leprosy from several sources, the chief channels of which were the early settlers on the shores of the Gulf of Mexico,

[1] Read before the Medical Section of the New Orleans Academy of Sciences, Mar 15, 1935.

[2] Now Chief Quarantine Officer, Panama Canal Zone.

the slaves imported from Africa in the slave ships of France, Spain, England, and of the American Colonies, and from the Acadian refugees from Canada.

Leprosy prevailed to a greater or lesser extent throughout Europe and was certainly not extinct in France, Spain, and Italy when the first French colony was founded in 1540, by Count de Roberval, near the port of St. Croix in Canada; and leprosy likewise was not extinct in the parent countries when, in 1699, Iberville landed on the shores of the Gulf of Mexico. No evidence has been introduced that leprosy existed in the new world before the time of Columbus, and the conclusion seems unavoidable that leprosy was brought to this continent from extraneous sources.

While it is possible that the mouth of the Mississippi River was discovered in 1519 by Alonzo Alvarez de Pineda and somewhat later by Panfilo de Narvaez, and that Hernando De Soto entered the borders of the present State of Louisiana, claims to the region were not made until Robert Cavelier, Sieur de la Salle, came down the river in 1682 from the French possessions to the north, and the vast drainage basin of the Mississippi was named in honor of Louis XIV. La Salle attempted to settle a colony in 1684 but missed the mouth of the Mississippi River and landed in Texas. However, in 1697, Pierre le Moyne d'Iberville, chosen to lead another colony, reached the Gulf coast early in 1699, and soon after building Fort Maurepas he erected a fort on the Mississippi River about 40 miles above the mouth, which was the earliest settlement in what is now the State of Louisiana.

Leprosy had already begun to establish itself in the Western Hemisphere, as Hans Sloane observed leprosy on the Island of Jamaica as early as 1687; but the first reference found to the existence of leprosy in what is now Louisiana was that by Dyer, who wrote that leprosy was present in 1758, 40 years after the founding of the city of New Orleans by Bienville. Ulloa, in 1766, was the first to take active preventive steps by isolating Louisiana lepers at the mouth of the river at Belize.

That the disease was present in the Province in sufficiently large numbers to attract more than passing attention is evidenced by the fact that one of the first measures of Miro's administration was the founding, in New Orleans, in 1778, of a hospital for lepers; the cabildo erected a structure for them in the rear of the city on a ridge of high land between it and the Bayou St. John, which is, perhaps, the ridge anciently separating the waters of the Mississippi from those of Lake Pontchartrain.[2] This colony, if such it might be called, was named "La Terre des Lepreaux", or Lepers' Land, and is recorded as having had but a brief existence, since in the course of a few years the number

[2] Believed to have been the section now bounded by North Johnson and North Galvez Streets and Ursuline and Orleans Streets

of patients gradually diminished, either by death or removal, and the disease almost entirely disappeared. The neglected building then went to ruin, and "Lepers' Land" is described as remaining for many years a wild-looking spot covered with brambles and palmettoes, until, by the growth of New Orleans under the flag of the United States, it became a part of the suburb of Treme.

Hospitalization of Louisianians suffering from leprosy subsequent to the discontinuance of Miro's Hospital, was largely provided for by quarters set aside in the pesthouse, otherwise known as the "Hagan Avenue Home", which continued to care for the afflicted until the State of Louisiana established its more commodious institution at Carville in 1894.

It seems to be the consensus of opinion among students of the subject that leprosy was brought to Louisiana by the Acadian refugees. In 1880 the president of the Board of Health of the State of Louisiana, after considerable research, regarded the existence of leprosy in New Brunswick, Canada, of great interest in connection with the existence of the disease in Louisiana, particularly since refugees from Canada established themselves in hospitable Louisiana, and he stated that, without doubt, at least a portion of the leprosy existing in the State at that time could be traced to the early French settlers in Canada. It must be noted, however, that, according to Dr. A. C. Smith, in his report to the International Dermatological Congress, leprosy developed in Cape Breton Province of Nova Scotia, among the immediate descendents of Scotch emigrants from the Hebrides, who arrived in Canada about 1810; and, according to Dr. Pagé, leprosy was first discovered in New Brunswick in 1815, and it established itself to such an extent that a lazaretto was built at Tracadie in 1844.

The newly arrived Acadians were greeted in Louisiana with tenderness and hospitality, and Kerlerec and Auberville allowed a tract of land to each family. They settled above the German coast on both sides of the Mississippi, and in the course of time their plantations connected the latter settlement with that of Baton Rouge and Pointe Coupe, a district that is still sometimes called the Acadian coast.

Some of the cases of leprosy which arose among the descendents of the Acadians without doubt derived their origin from the French settlers of the barren and rocky coast of Nova Scotia; and racial predilection seems the only explanation for the continued infection in direct descendants from these French Acadians.

That leprosy was introduced into Louisiana partly from slaves imported from Africa is commonly accepted. A few years after the French established their colony at Biloxi, it was noted that the African slaves suffered from a number of peculiar diseases, some of

which were apparently yaws and leprosy. To what extent these slaves suffering from leprosy more than 175 years ago were responsible for the transfer of the disease from the sick to the well is difficult to determine. It seems logical, however, to accept without reservation the importance of this infected group of newcomers. It would seem, from an epidemiological standpoint, that the Negro slaves moving from endemic centers of leprosy, where the rates of natural infection are believed to have been high, into a more salubrious climate, with unquestionably improved hygienic and sanitary surroundings, comparing the former primitive habits with those forced upon them by slavery, lost considerable susceptibility to leprous infection, as evidenced by the fact that at the present time the rate of infection among Negroes in this State is considerably lower than the rate among the whites.

The progress of leprosy in the State, once it had become firmly implanted, has followed, as one would anticipate, lines of communication and further colonization, and the disease has spread into towns and cities in a radial manner from New Orleans as the center.

Interest in leprosy in the State was considerably revived about 1880 by investigations already referred to by Dr. Jones, then president of the State board of health. His attention, from an epidemiological viewpoint, was drawn to the apparent increase in the disease within the State limits by newspaper and other publicity which had aroused public interest almost to the point of hysteria.

Several epidemiological surveys were made, which included a study of the alleged alarming increase in leprosy in certain parts of the State, and especially on the banks of the lower La Fourche; and Dr. Jones noted that the number of cases appeared to be much less than had been represented, but that a sufficient number of cases occurred to excite earnest attention of the authorities charged with educational, sanitary, and legislative affairs of the people of the State. He felt, further, that those afflicted with leprosy should be isolated, such seclusion or isolation to be accomplished by the erection of a leper house, ward, or hospital in those districts in which the disease existed, and that they should be placed under the direction and control of one or more local practitioners of medicine. He felt that it was manifestly the duty of the State to provide for the maintenance of the victims of leprosy, that the practice of introducing patients suffering from leprosy into the already crowded wards of Charity Hospital should be discontinued, and that public authorities of the city or State should provide suitable buildings or wards where the lepers might be properly isolated and secluded.

In 1892, Dr. H. W. Blanc reported his conclusions from the observations made upon 84 cases of leprosy seen in his 5 years of dermatological practice in New Orleans.

The insistence of the State board of health and the almost unanimous concerted action of the city and State medical societies resulted in legislation and adequate plans for the future segregation of the lepers of Louisiana. After several unsuccessful attempts to obtain a suitable site for the location of a leper home, in 1894 the institution was finally established at Carville, on the Indian Camp Plantation. In August 1894 the State legislature passed the act to provide for the appointment of a board of control for the leper home and to provide for the care and treatment of persons afflicted with leprosy. The early vicissitudes of the new leper home can be well pictured from the first report of the board of control to the Governor and members of the State legislature, from which the following abstract was taken:

> On the last day of November, the first contingent of lepers were transported from New Orleans, by night, to their present home.
>
> This was accomplished with the greatest difficulty, on a coal barge, towed by a tug. The details of this trip, in all their awfulness, have been depicted in the daily press.
>
> For a time the existence of the home was threatened by the inhabitants of Iberville Parish.
>
> A rational judgment, however, supplanted an early and misguided prejudice, and the poor sufferers were only pitied the more because they wished for themselves an isolation which the law compelled.

The Louisiana Leper Home continued to serve as a haven for afflicted Louisianians until January 3, 1921, when the Federal Government, by purchase, assumed custody of the institution and the obligation of its future operation as a Federal institution, a unit of the Public Health Service hospital system for the hospitalization of all persons suffering from leprosy within the continental limits of the United States.

From its inception as a Louisiana leper home and over a period of 41 years, 519 Louisianians have been hospitalized, an average of approximately 12 new patients per annum; and it is interesting to note that for the last 10 years this average of 12 has rarely been exceeded.

In 1904, Isadore Dyer reported to the International Dermatological Congress that, while formerly, New Orleans, La Fourche, and St. Martinsville were the only known centers of leprosy infection, in 1897 there were 20 parishes, situated mainly in the southern half of Louisiana, which had developed cases. Subsequently, 12 additional parishes have been added, making a total of 32 parishes which have developed cases.

It is regretted that this brief summary cannot be closed with a statement that the leprosy problem in Louisiana has been solved. However, since there are now living in the National Leprosarium at Carville 94 Louisiana patients and there has been no diminution in

the number of new patients admitted yearly for a decade, and accepting that, on the average, during his lifetime, one person suffering from leprosy transmits the disease to one nonleprous person, it seems logical to conclude that the incidence of the disease has reached a level and that continued segregation, particularly of early cases before they have infected others, is a solution almost within grasp.

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OXIDATION OF SEWAGE BY ACTIVATED SLUDGE

By P. D. McNamee, *Assistant Chemist, United States Public Health Service*

It is quite natural that the rate of biochemical oxidation of dilute sewage mixtures, which has been carefully studied (*1*) (*2*), should be assumed to hold for the biological oxidation devices, such as the activated sludge process. The lack of experimental evidence to the contrary and the fact that the oxygen demand of the sludge itself, excepting the first day, conforms fairly well with the established rates for sewage mixtures have doubtless contributed to this view. The general conception of the activated sludge process is that there is a rapid adsorption of organic matter by the sludge and that the adsorbed material is then oxidized biochemically at a rate approximating that observed for a polluted water or sewage mixture.

The conditions under which the organic matter is oxidized in the activated sludge treatment plant and in a bottle are quite different. Under the conditions of the biochemical oxygen demand test, the bacteria are relatively few at the start and multiply until a limiting number is reached. In the activated sludge process, the sewage is added to a material in which many bacteria are concentrated in the zoogleal masses (*3*), so that the number of bacteria present per unit volume far exceeds that which is ordinarily reached. The activated sludge floc can be considered a bacterial colony in liquid media. Thus a solution containing enough of the dispersed zoogleal bacteria to give it a milky appearance will produce only a small amount of

floc, so that with a solution containing 1,000 p. p. m. of floc, there are so many bacteria concentrated in the floc that the actual number present far exceeds that ever observed in the dispersed condition.

Under these conditions it is reasonable to suppose that the organic matter might be oxidized at an accelerated rate. Likewise, it might be inferred that slow-growing bacterial species, such as nitrifying organisms, would require more time to accomplish a given amount of work than the more active species utilizing carbonaceous materials under the conditions imposed by the biochemical oxygen demand test, where two definite stages of oxidation are observed. With activated sludge, it may take 3 weeks to build up an actively nitrifying variety. Once the organisms are present in sufficient numbers, they should oxidize ammonia from the start and the two stages observed under the former condition might proceed simultaneously in the activated sludge plant, it being understood that the ammonia formed from the decomposition of nitrogenous substances must necessarily be released before it can be utilized. A study of the oxidation of sewage in the presence of activated sludge would furnish valuable information on these possibilities.

The work done along these lines has dealt with the oxygen demand of the sludge-sewage mixtures. Grant, Hurwitz, and Mohlman (*4*) computed a value for the oxygen demand of sewage in the presence of activated sludge by treating sewage with varying amounts of activated sludge, determining the oxygen demand, and deducting the average oxygen demand value of the sludge from the observed values for sludge plus sewage. They obtained a negative oxygen demand for sewage in the presence of 4,740 p. p. m. of sludge, the difference being within the limits of experimental error. With decreasing amounts of sludge, they observed increasing oxygen demands for the sewage; the maximum oxygen demand was 10 p. p. m. in 2 hours in the presence of 920 p. p. m. of sludge. Recently Kessler and Nichols (*5*) have shown that the rate of utilization of oxygen by activated sludge dosed with sewage drops rapidly the first few hours. They found that, on treating activated sludge with sewage, the mixture used up oxygen at the rate of 54 p. p. m. of oxygen per hour during the first hour (computed from 6-minute tests), and that this figure dropped rapidly so that after 3 hours of aeration the mixture was using oxygen at the rate of 20 p. p. m. per hour. Unless this sewage contained unusual amounts of substances capable of reacting directly with dissolved oxygen, this would indicate a very rapid biological oxidation of the sewage.

At the London School of Hygiene, experiments under the direction of Prof. W. W. C. Topley (*8*) indicated that "the rate of oxidation of a mixture of crude sewage and activated sludge is much greater than

the sum of the rates for the constituents treated separately." The oxygen adsorption was measured by a modified Barcroft respirometer. "The respirometer consists of two glass flasks of about the same volume (35 to 40 ml) connected one on each side of a differential manometer." The apparatus is calibrated so that the manometer readings serve as a measure of oxygen removal and the carbon dioxide is adsorbed in a small inner tube which contains a 10-percent aqueous solution of potassium hydroxide. The results of a group of experiments are given in table 7 of the "Report of the Water Pollution Research Board for the year ended 30th June, 1935", and are presented here as table 1.

TABLE 1.[1]—*Absorption of oxygen from air at 22° C. by crude sewage, activated sludge, and mixtures of sewage and sludge*

Oxygen in cubic millimeters at 0° C. and 760 mm.

[W = water; C. S = crude sewage; S. L. = activated sludge]

Contents of Barcroft flasks		Period in hours					
Left-hand flask	Right-hand flask	1	2	3	4	5	6
A. 3 ml W	2 ml C. S.+1 ml W	16	32	46	49	55	60
B. 3 ml W	1 ml S L.+2 ml W	51	97	137	175	204	227
C. 3 ml W	1 ml S L.+2 ml C. S	116	229	336	416	532	605
D. 1 ml S. L +2 ml W	1 ml S L +2 ml C. S	81	148	210	279	325	391
E. 2 ml C. S+1 ml W	2 ml C. S+1 ml S. L.	102	211	305	408	484	555
A+B		67	129	183	224	259	287
C−(A+B)		49	100	153	222	273	318
E−B		51	114	168	233	280	328
D−A		65	116	104	230	270	331

[1] Table 7 of "Report of the Water Pollution Research Board for the year ended 30th June, 1935."

These workers concluded "that by mixing crude sewage and activated sludge the rates of oxidation of the sewage or sludge or both by air are greatly accelerated." In similar experiments they found that effluents likewise used oxygen more rapidly in the presence of sludge than in its absence.

METHOD FOR THE DETERMINATION OF THE OXYGEN DEMAND OF SEWAGE IN THE PRESENCE OF ACTIVATED SLUDGE

The apparatus described by Theriault and McNamee (*6*) was used for the study of the oxidation of sewage in the presence of activated sludge. In this apparatus a measured volume of the sludge-sewage mixture is placed in a bottle, where the air above the liquid is recirculated through the liquid in a closed system. Ten-milliliter samples of the air are removed for analysis at definite time intervals. By using a modified Winkler procedure for determining the oxygen, the oxygen content of a milliliter of air, expressed in milligrams, can

be measured accurately to the fourth decimal place. For the present study, two bottles were used. One bottle contained a liter of sludge with its supernatant liquid; the other contained a liter of sludge, which was allowed to settle, and then the supernatant liquid was replaced by sewage. The oxygen demand of the sludge-sewage mixture plus the oxygen demand of the removed supernatant liquid represents the sum of the oxygen demands of a liter of the sludge and of the sewage. The value for the oxygen demand of a liter of sludge is subtracted from the above value to obtain the oxygen demand of the added sewage. The oxygen demand of the supernatant liquid is

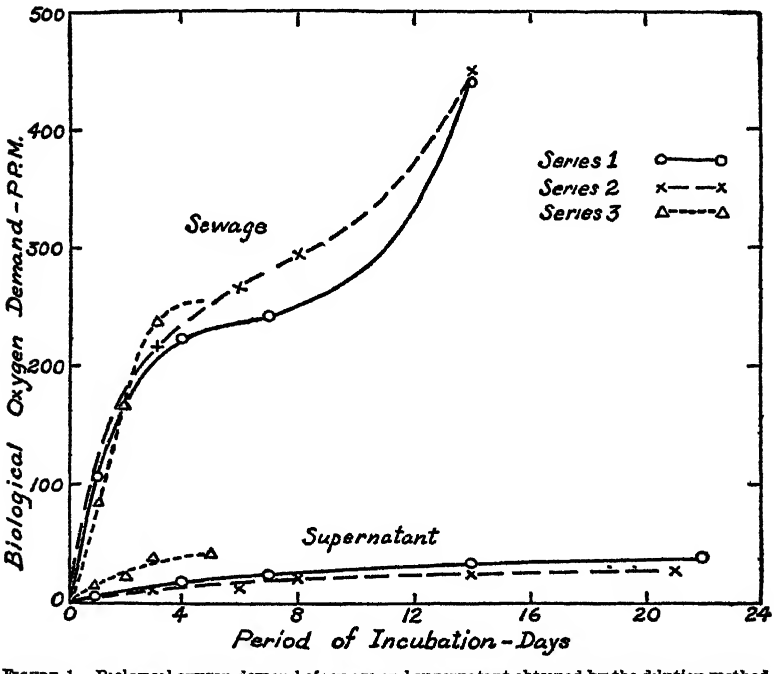

FIGURE 1.—Biological oxygen demand of sewage and supernatant obtained by the dilution method.

relatively small and could be neglected without doing serious damage to the results. This method was used in order to have the same amount of sludge present in each liter of solution.

OXIDATION OF SEWAGE BY "GOOD" ACTIVATED SLUDGE

The sludge used in series 1 had all the characteristics of "good" activated sludge. The sludge was from the north sewage treatment plant of Lancaster, Pa. In other experiments it was found that this sludge removed from 75 to 90 percent (based on the first-stage biochemical oxygen demand) of the oxidizable matter from sewage in a period of 30 minutes. The sludge was actively nitrifying and settled

readily, leaving a clear supernatant. Prior to the start of the experiment, the sludge was treated with sewage and aerated for 18 hours. The suspended matter content was 4,396 p.p.m. Two 1-liter portions of this sludge were used in the experiment. One portion was placed in an aeration bottle without further treatment. The other liter was placed in a cylinder and allowed to settle; then 700 ml of the supernatant liquid was siphoned off and the volume of the settled sludge was made up to one liter by the addition of 700 ml of sewage, which had been filtered through cotton. At the start of the experiment, the pH of the sludge was 7.35 and that of the sludge-sewage mixture, 8.40. The biological oxygen demands of the supernatant liquid and the filtered sewage were determined by the dilution method, and the values are presented in table 2 and figure 1, where the time is plotted in days.

TABLE 2.—*Oxygen demand (dilution method) of sewage and supernatant*

Days incubated	Series 1		Series 2		Series 3	
	Sewage	Supernatant	Sewage	Supernatant	Sewage	Supernatant
	Oxygen demand—Parts per million					
1	107	5.6			87.5	16.8
2					166.5	23.2
3			216	12.8	240	40.2
4	224	19.0				
5					257.5	44.0
6			267	14.2		
7	244	23.0				
8			297	21.6		
14	442	34.0	451	27.6		

The temperature of the sludge and sewage was adjusted to 20° C. and the experiment was conducted in a 20° C. incubator. The data of series 1, 2, and 3 are given in table 3. The results of series 1 are presented in figure 2. This series was discontinued after 24 hours. The sludges from the two bottles were composited and 50 ml of phosphate buffer (pH 7.2) added. The sludge was again divided into equal parts and used in a similar experiment designated series 2. The pH of the sludge used in series 2 was 7.22 and that of the sludge-sewage mixture, 7.25. Owing to the poorer settling quality of the sludge, only 600 ml of supernatant liquid was replaced by sewage in series 2. The biological oxygen demand values obtained in series 2 are given in figure 3.

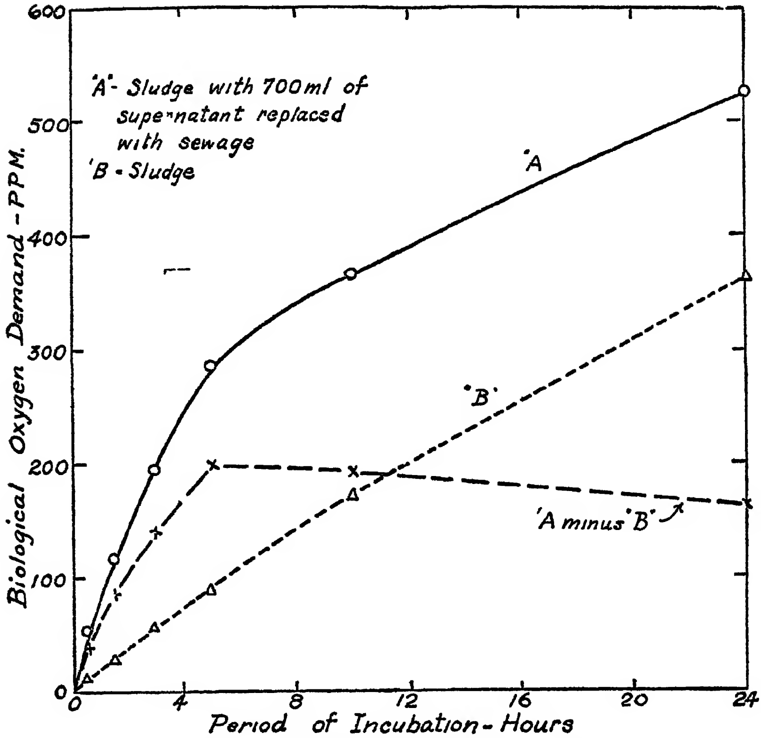

FIGURE 2—Series 1 Biological oxygen demand of sludge and sludge sewage mixture obtained by the aeration method

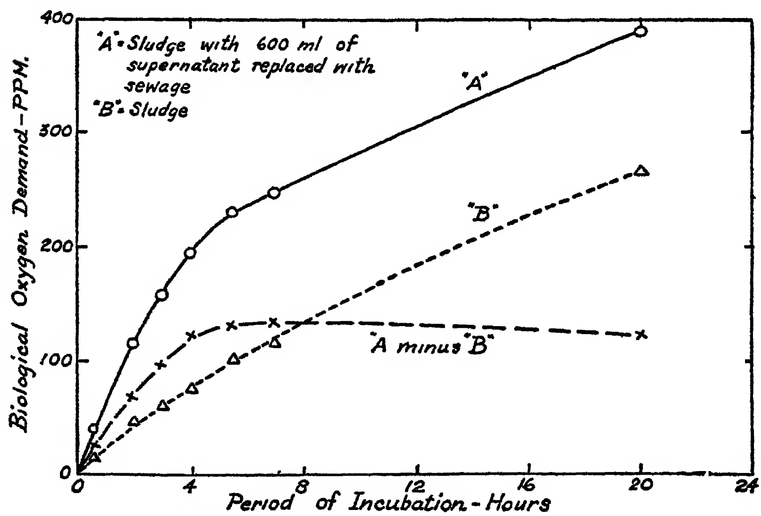

FIGURE 3—Series 2 Biological oxygen demand of sludge and sludge sewage mixture obtained by the aeration method

TABLE 3.—*Observed oxygen demands of sludge and sludge-sewage mixtures*

Time in hours	Series 1			Series 2			Series 3		
	Sludge with 700 ml supernatant replaced by sewage=A	Sludge=B	A—B	Sludge with 600 ml supernatant replaced by sewage=A	Sludge=B	A—B	Sludge with 700 ml supernatant replaced by sewage=A	Sludge=B	A—B
	Oxygen demand—Parts per million								
0.5	55.0	14.5	40.5	42.2	15.7	26.5	31.3	5.5	25.8
1.5	116.9	28.6	88.3						
2.0				116.3	49.4	66.9	87.8	24.3	63.5
3.0	196.0	56.5	139.5	161.0	61.6	99.4	112.8	32.1	80.7
4.0				197.6	75.7	121.9			
4.5							151.9	50.6	101.3
5.0	287.0	87.6	199.4						
5.5				234.2	102.9	131.3			
7.0				250.7	117.6	133.1			
10.0	367.0	172.9	194.1				245.0	104.9	140.1
20.0				390.7	269.7	121.0			
24.0	529.4	367.4	162.0				384.2	230.3	153.9

In order to obtain the oxygen demand of the sewage, a correction is applied for the oxygen demand of the supernatant liquid which was removed from the one portion. The 1-day oxygen demand of the supernatant removed from series 1 was found, by the dilution method, to be 5.6 p. p. m. This would give a correction of 0.16 p. p. m, $\left(5.6\times\frac{700}{1000\times 24}\right)$ per hour. Since the supernatant liquid had been in contact with the sludge for 18 hours, and since the sludge curve does not break sharply, this correction is distributed evenly over the 24-hour period. The negative slope of part of the curve A—B in series 1 and 2 indicates a much higher demand of the supernatant. In view of the fact that the sewage was oxidized much more rapidly in the presence of sludge, it appears that the supernatant also is oxidized more rapidly when sludge is present. This conclusion was also reached by the workers at the London School of Hygiene. The corrections for the oxygen demand of the supernatants were, therefore, based on the 14-day oxygen demand rather than the 1-day value. This amounts to a correction of approximately 1.0 p. p. m. per hour. This correction raised the 20-hour oxygen demand value of the sewage enough to remove the negative slope from the graph of the values observed in series 2. It did not, however, raise the 24-hour oxygen demand value of the sewage in series 1 enough to bring it in line. The difference in pH of the sludges in series 1 may account for this discrepancy. The oxygen demand values of the sewages in the presence of activated sludge, plotted in figure 4, were obtained from the corrected A—B curves and represent the milligrams of oxygen utilized by 1 liter of the sewage.

The oxidation of the sewage in the presence of activated sludge is much more rapid than the oxidation which takes place under the conditions of the biological oxygen-demand test. It is to be remem-

bered that the sewage used in these experiments was freed from large suspended particles by filtration through cotton, and so the rates observed are for the oxidizable matter in solution or in a colloidal state. In the presence of "good" activated sludge, series 1 and 2, the oxidation of the sewage by the activated sludge was practically completed in 5 hours. That is, after 5 hours the curve for the oxidation of sewage in the presence of activated sludge ceased to rise. In series 1, the 5-hour oxygen demand of the sewage in the presence of activated sludge has the same value as the 240-hour oxygen demand of the same sewage as determined by the dilution method and is

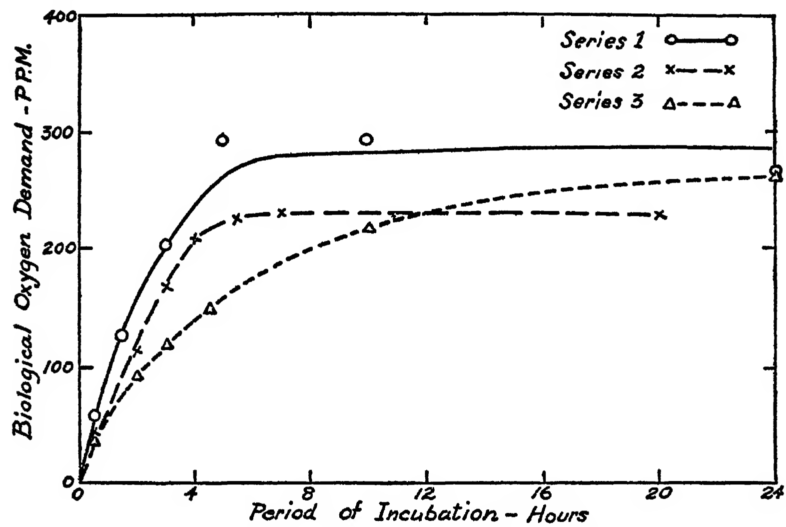

FIGURE 4.—Oxidation of sewage in the presence of activated sludge

more than the total first-stage demand. In the presence of activated sludge, 24 percent of the 7-day biological oxygen demand was satisfied in 30 minutes, 54 percent in 1.5 hours, 83 percent in 3 hours, and 119 percent in 5 hours. Compared with the 14-day oxygen demand obtained by the dilution method, the sewage in series 1 was 63 percent oxidized and that of series 2 about 50 percent oxidized. This probably indicates that the end products of the dilution method are different from those produced by the activated sludge, and the higher state of oxidation would be reached only with the decomposition of the activated sludge floc.

OXIDATION OF SEWAGE BY "POOR" ACTIVATED SLUDGE

The oxidation of sewage in the presence of "poor" activated sludge is shown in the graphs marked series 3 (fig. 5).

The sludge used in this series was taken from the aeration tank of a small experimental activated sludge plant which had been in opera-

tion only a few weeks. The temperature in the aeration tank was 6° C., and the suspended matter content of the tank was below 1,000 p. p. m. The sludge settled very poorly, and the supernatant liquid was loaded with finely dispersed particles, which gave it a marked turbidity. The sludge was concentrated by settling and the suspended matter content of the mixtures in series 3 was 2,720 p. p. m. Seven hundred milliliters of sewage were used in this experiment. This sludge was not nitrifying. The nitrite content of the mixture increased from 0.4 to 0.5 p. p. m. in the 24 hours during which the mixture was aerated. The nitrate content remained constant at 0.5 p. p. m. The sewage and supernatant in the dilution bottles started to nitrify on the fifth day. For this reason the cor-

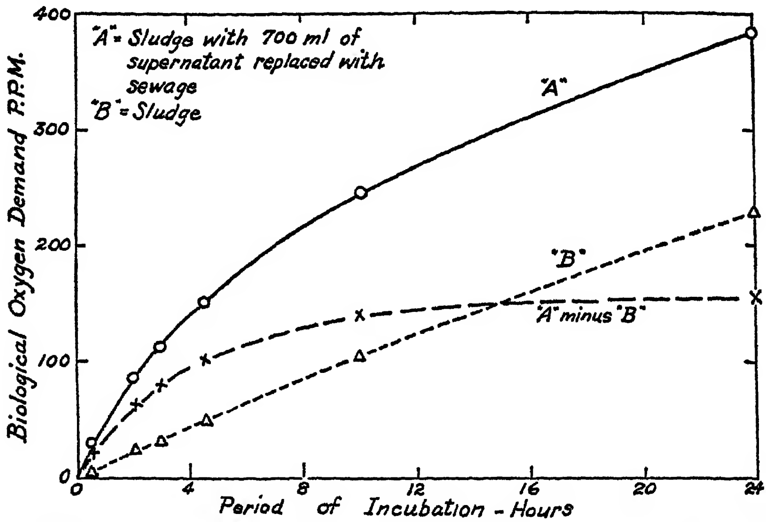

FIGURE 5.—Series 3. Biological oxygen demand of sludge and sludge-sewage mixture obtained by the aeration method.

rection for supernatant is based on the 5-day oxygen demand. With this particular sludge, more time was required for the oxidation of the sewage, so that considerable oxidation was noted between the tenth and twenty-fourth hour. In spite of the fact that this can be considered a poor activated sludge, the sewage was oxidized much more rapidly in its presence. The percentage of the 5-day B. O. D. satisfied in 0.5, 2, 3, 4.5, 10, and 24 hours was 14.6, 36.6, 46.9, 59.3, 84.7, and 102.5, respectively. That is, in the presence of the activated sludge, the oxygen absorbed by sewage was greater in 1 day than the 5-day oxygen demand, determined by the dilution method, of the same sewage.

The term "poor" refers to the physical property of the sludge and not to its oxidizing capacity. On the basis per gram of sludge, the percentage of the 5-day oxygen demand of the sewage satisfied in a

given time by the sludge of series 3 is not much different from that observed in series 1 and 2:

Time (hours)	0.5	3.0	10
	Percent of 5-day oxygen demand of sewage satisfied per gram of sludge		
Series 1	5.8	20.1	29.0
Series 2	4.1	15.5	20.9
Series 3	5.3	17.2	31.1

RATE OF OXIDATION

The deoxygenation constant, k, observed in this group of experiments is much larger than that observed for polluted water. The unimolecular equation $Y=L(1-10^{-kt})$ does not fit the observed values for the oxidation of sewage in the presence of activated sludge of series 1 and 2 very satisfactorily. This is to be expected if nitrification is in progress. Using the statistical treatment method of Reed and Theriault (*7*) for determining the k value, k (when t is expressed in days) for series 1 was found to be 2.009, and for series 2 it was 1.992. The same k value (2.0) gave values for series 3 which were in good agreement with the observed values. The k value of 2.0 corresponds with the value of 0.1 observed for river water. It is significant that this is practically the same k value (2.0) as was deduced by Theriault (*6*) from the mathematical analysis of a single sludge oxidation curve. He concluded that the curve was the resultant of two curves, one representing a rapid oxidation and the other a much slower oxidation. This rapid oxidation was attributed to a purely chemical or enzymatic effect by Theriault and McNamee (*6*). The sludge used in these experiments was taken from the bottom of a channel, and it is probable that it contained reduced substances capable of reacting with dissolved oxygen. However, in the light of the present experiment, it is probable that the greater part of this "immediate" oxygen demand resulted from the oxidation of the organic matter present in the sludge liquor. No attempt has been made in the present experiment to study the mechanism of the oxidation process. This rapid oxidation may or may not be enzymatic.

SUMMARY

The soluble and colloidal matter of sewage is oxidized much more rapidly than has generally been realized. "Good" activated sludge can dispose of the greater part of the oxidizable substances in a period of 5 hours; less efficient activated sludge may require a much longer time. In the presence of nitrifying activated sludge, the

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5-hour oxygen demand of the sewage may be greater than the total first-stage oxygen demand. The total oxygen demand of the sewage in the presence of activated sludge is lower than the total oxygen demand observed under the conditions of the biochemical oxygen demand test, which probably means that a considerable amount of the material is used to synthesize activated sludge flocs. If this be the case, then, strictly speaking, the sewage cannot be considered completely oxidized until the sludge itself is disintegrated by other organisms. If nitrification is occurring, the rate of oxidation of the sewage in the presence of activated sludge cannot be expressed very satisfactorily by the unimolecular equation. Compared with the k value of 0.1 observed for river water, the k value observed for sewage in the presence of activated sludge is about 2.0. It is concluded that a large part of the oxidation required for the stabilization of the oxidizable substances present in sewage occurs during the first few hours of contact with "good" activated sludge.

ACKNOWLEDGMENTS

It is desired to express appreciation to the members of the Stream Pollution Investigations Station of the United States Public Health Service for their valuable assistance and to Principal Chemist C. C. Ruchhoft for his helpful suggestions throughout this experiment.

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DEATHS DURING WEEK ENDED JULY 11, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 11, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8,528	7,657
Deaths per 1,000 population, annual basis	11.9	10.7
Deaths under 1 year of age	543	511
Deaths under 1 year of age per 1,000 estimated live births	49	53
Deaths per 1,000 population, annual basis, first 28 weeks of year	12.8	12.1
Data from industrial insurance companies:		
Policies in force	68,562,192	67,930,187
Number of death claims	11,226	12,419
Death claims per 1,000 policies in force, annual rate	8.6	9.6
Death claims per 1,000 policies, first 28 weeks of year, annual rate	10.5	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

Reports for Weeks Ended July 18, 1936, and July 20, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 18, 1936 and July 20, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935
New England States:								
Maine					84	49	0	0
New Hampshire		1			1	1	0	0
Vermont					13	44	0	0
Massachusetts	9	5			273	98	1	1
Rhode Island	3				13	76	0	0
Connecticut		7		1	41	70	0	0
Middle Atlantic States:								
New York	37	16	[1] 5		660	925	4	8
New Jersey	19	5	7		171	309	5	0
Pennsylvania	36	28			277	553	2	7
East North Central States:								
Ohio	15	13	3	3	259	181	6	2
Indiana	8	7	15	13	1	20	2	1
Illinois	15	25	4	6	16	209	8	8
Michigan	11	7	1		35	619	1	4
Wisconsin		3	16	19	72	581	0	0
West North Central States:								
Minnesota	5	6			25	37	0	0
Iowa	6	12			2	18	1	3
Missouri	10	27	11	17	10	35	1	4
North Dakota			1		2	13	0	0
South Dakota		2			1	8	0	0
Nebraska	5	5			2	11	0	0
Kansas	2	5		8	7	52	1	2
South Atlantic States:								
Delaware		1			3	12	0	1
Maryland [2 3]	6	8	3	2	129	33	2	2
District of Columbia [2]	8	10		1	32	5	3	2
Virginia [2]	6	8			36	37	4	2
West Virginia [2]	3	9	4	13	4	17	8	2
North Carolina	11	6			6	9	3	2
South Carolina [4]	8	4	23	58	2	1	0	1
Georgia [4]	7	17					1	0
Florida		6	1		7	3	8	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 18, 1936, and July 20, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935
East South Central States:								
Kentucky	1	5	-------	-------	7	50	12	2
Tennessee [2]	1	5	56	5	18	19	2	3
Alabama [4]	13	19	2	7	1	17	2	1
Mississippi [3]	1	12	-------	-------	-------	-------	0	0
West South Central States:								
Arkansas	4	3	2	3	-------	4	0	0
Louisiana	9	11	18	13	1	15	2	0
Oklahoma [5]	10	4	6	20	2	7	1	0
Texas [4]	21	23	30	11	55	15	0	1
Mountain States:								
Montana	-------	1	-------	-------	2	49	0	1
Idaho [3]	-------	-------	-------	-------	12	3	1	0
Wyoming [2]	-------	1	-------	-------	6	14	0	0
Colorado	3	9	-------	-------	9	32	0	1
New Mexico	1	1	3	3	4	3	1	0
Arizona	1	-------	6	-------	24	-------	1	0
Utah [3]	-------	-------	-------	-------	23	5	0	0
Pacific States:								
Washington	-------	1	-------	-------	36	75	0	0
Oregon [2]	2	2	10	3	5	53	0	1
California	23	34	11	12	206	294	6	2
Total	310	372	238	220	2,685	4,681	84	65
First 29 weeks of year	13,995	16,615	141,011	103,000	205,634	687,538	5,699	3,860

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935
New England States:								
Maine	4	0	4	4	0	0	1	4
New Hampshire	0	1	1	0	0	0	0	1
Vermont	2	0	3	7	0	0	0	0
Massachusetts	3	12	54	53	0	0	20	2
Rhode Island	0	2	9	7	0	0	0	0
Connecticut	1	3	7	6	0	0	1	2
Middle Atlantic States:								
New York	4	21	155	177	0	0	11	13
New Jersey	0	1	40	28	0	0	6	3
Pennsylvania	1	1	179	182	0	0	6	62
East North Central States:								
Ohio	2	1	118	74	3	0	20	7
Indiana	1	0	22	13	0	0	9	8
Illinois	2	2	109	166	19	1	10	18
Michigan	0	0	86	82	0	0	9	15
Wisconsin	0	1	60	83	5	10	0	6
West North Central States:								
Minnesota	0	0	16	43	0	4	1	23
Iowa	1	0	20	19	9	6	0	2
Missouri	0	2	35	13	3	0	17	25
North Dakota	0	0	7	15	0	0	2	1
South Dakota	0	0	8	4	3	3	1	0
Nebraska	0	0	20	10	6	3	1	0
Kansas	0	0	35	17	0	7	5	13
South Atlantic States:								
Delaware	0	1	0	2	0	0	1	3
Maryland [2,3]	0	0	13	17	0	0	11	18
District of Columbia [2]	0	1	3	3	0	0	2	1
Virginia [3]	2	72	13	17	0	0	15	46
West Virginia [2]	0	0	25	11	0	0	8	16
North Carolina	2	48	11	19	1	1	16	37
South Carolina [4]	0	1	0	2	0	0	9	23
Georgia [4]	2	1	4	1	0	0	41	61
Florida	0	0	5	3	0	0	1	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 18, 1936, and July 20, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935	Week ended July 18, 1936	Week ended July 20, 1935
East South Central States:								
Kentucky	2	5	8	12	0	0	14	39
Tennessee [2]	30	3	5	11	0	0	33	38
Alabama [4]	35	3	9	15	0	0	16	16
Mississippi [3]	12	0	3	12	0	0	14	17
West South Central States:								
Arkansas	0	1	1	4	0	5	14	34
Louisiana	1	7	-------	4	0	0	25	24
Oklahoma [5]	0	0	11	4	0	0	27	27
Texas [4]	1	1	31	17	1	0	46	32
Mountain States:								
Montana	0	0	23	4	22	8	2	1
Idaho [2]	0	0	6	1	2	0	1	0
Wyoming [2]	0	0	6	11	0	10	0	1
Colorado	0	0	9	29	1	0	1	4
New Mexico	0	0	12	6	0	0	8	6
Arizona	1	0	3	4	0	0	2	2
Utah [3]	0	0	15	34	0	0	0	2
Pacific States:								
Washington	3	0	16	11	0	23	1	3
Oregon [2]	0	1	7	27	2	1	3	3
California	7	35	86	73	1	3	7	7
Total	119	227	1,389	1,357	78	85	438	672
First 29 weeks of year	823	1,509	179,921	176,437	6,043	5,166	4,714	6,293

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended July 18, 1936, 18 cases, as follows: Maryland, 3; District of Columbia, 1; Virginia, 5; West Virginia, 1; Tennessee, 3; Idaho, 3; Wyoming, 1; Oregon, 1.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended July 18, 1936, 36 cases, as follows: South Carolina, 1; Georgia, 10; Alabama, 16; Texas, 9.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1936										
Florida	13	11	23	16	91	5	0	24	0	17
June 1936										
Colorado	6	13	1	-------	80	-------	2	137	5	3
Maryland	18	28	4	2	[illegible]	4	1	[illegible]	0	12
Michigan	11	61	1	5	[illegible]	1	3	1,244	1	17
Minnesota	10	22	5	1	[illegible]	-------	0	[illegible]	58	19
New Jersey	8	36	31	0	[illegible]	-------	3	[illegible]	0	17
Ohio	24	79	53	6	1,822	-------	2	651	0	32
Pennsylvania	24	134	-------	1	3,573	-------	4	1,3[illegible]2	0	61
Texas	7	97	310	2,565	658	71	6	118	8	45
Vermont	-------	-------	-------	-------	725	-------	0	45	0	4

May 1936	Cases
Florida:	
Chicken pox	105
Dysentery	1
Mumps	143
Rabies in man	1
Typhus	1
Undulant fever	2
Whooping cough	67
June 1936	
Anthrax in man:	
Pennsylvania	2
Chicken pox:	
Colorado	67
Maryland	259
Michigan	1,186
Minnesota	159
New Jersey	901
Ohio	762
Pennsylvania	1,471
Texas	80
Vermont	108
Diarrhea:	
Maryland	9
Diarrhea and enteritis:	
Ohio (under 2 years)	11
Dysentery:	
Colorado (amoebic)	1
Maryland (bacillary)	4
Michigan (amoebic)	1
Michigan (para)	1
Minnesota (amoebic)	5
Minnesota (bacillary)	1
New Jersey (amoebic)	3
Ohio (bacillary)	1
Pennsylvania (amoebic)	1
Pennsylvania (bacillary)	1
Texas (bacillary)	82
Epidemic encephalitis:	
Colorado	1
Maryland	1
Minnesota	1
New Jersey	5
Pennsylvania	1
Texas	1

June 1936—Continued	Cases
German measles:	
Maryland	230
New Jersey	749
Ohio	69
Pennsylvania	911
Vermont	34
Impetigo contagiosa:	
Maryland	8
Lead poisoning:	
Maryland	1
Michigan	2
Ohio	16
Mumps:	
Colorado	127
Maryland	828
Michigan	852
New Jersey	1,111
Ohio	476
Pennsylvania	1,512
Texas	558
Vermont	72
Ophthalmia neonatorum:	
Maryland	3
New Jersey	13
Ohio	62
Pennsylvania	1
Paratyphoid fever:	
Michigan	1
Texas	4
Puerperal septicemia:	
Ohio	2
Rabies in animals:	
Maryland	1
Michigan	8
New Jersey	26
Texas	18
Rabies in man:	
Pennsylvania	1
Rocky Mountain spotted fever:	
Colorado	2
Maryland	3
New Jersey	1
Pennsylvania	1

June 1936—Continued	Cases
Septic sore throat:	
Maryland	11
Michigan	24
Ohio	120
Tetanus:	
Maryland	1
New Jersey	1
Ohio	6
Pennsylvania	1
Trachoma:	
Minnesota	1
New Jersey	3
Ohio	4
Pennsylvania	1
Trichinosis:	
Michigan	4
Ohio	1
Tularaemia:	
Minnesota	8
New Jersey	1
Texas	4
Typhus fever:	
New Jersey	1
Texas	6
Undulant fever:	
Maryland	3
Michigan	10
Minnesota	4
New Jersey	6
Ohio	3
Pennsylvania	1
Vincent's infection:	
Maryland	16
Michigan	15
Whooping cough:	
Colorado	139
Maryland	374
Michigan	1,417
Minnesota	102
New Jersey	531
Ohio	1,016
Pennsylvania	1,011
Texas	126
Vermont	63

PLAGUE INFECTION IN CALIFORNIA

The director of public health of California has reported plague infection in a collection of 113 fleas received at the laboratory on July 2, 1936, from 4 miles northwest of Santa Cruz, Santa Cruz County. He has also reported plague infection in ground squirrels received at the laboratory on July 9 from localities in Modoc County, as follows: 1 squirrel from 8 miles north and 5 miles east of Davis Creek; 1 squirrel from 1 mile southeast of Buck Creek, Rangers Station; and 1 squirrel from 2 miles south and 1 mile west of Buck Creek, Rangers Station.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 11, 1936

[This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.]

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	16	1	1	0	0	0	0	20
New Hampshire:											
Concord	0	------	0	0	0	1	0	0	0	0	14
Manchester	------	------	------	------	------	------	------	------	------	------	------
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	2	4
Rutland	0	------	0	3	0	0	0	0	0	0	5
Massachusetts:											
Boston	7	------	0	95	21	18	0	15	0	53	240
Fall River	1	------	1	0	5	2	0	1	0	0	29
Springfield	0	------	0	1	0	1	0	2	0	0	28
Worcester	0	------	0	37	2	3	0	3	0	3	51
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	0
Providence	1	------	1	10	1	5	0	3	0	7	73
Connecticut:											
Bridgeport	0	------	0	6	3	0	0	0	0	7	33
Hartford	0	------	0	0	0	2	0	1	1	0	30
New Haven	0	------	0	0	1	0	0	0	1	6	33
New York:											
Buffalo	0	------	0	63	9	15	0	7	0	2	148
New York	36	2	1	384	47	73	0	83	5	96	1,362
Rochester	0	------	0	3	3	0	0	2	0	5	65
Syracuse	0	------	1	20	5	3	0	1	0	12	50
New Jersey:											
Camden	1	------	0	1	0	1	0	0	0	1	23
Newark	0	------	0	22	4	8	0	11	0	22	125
Trenton	0	------	0	5	1	0	0	0	1	4	36
Pennsylvania:											
Philadelphia	5	2	1	70	8	15	0	18	2	63	375
Pittsburgh	1	------	1	2	11	23	0	4	0	22	150
Reading	0	------	0	4	3	0	0	0	0	4	47
Scranton	1	------	------	0	------	0	0	------	0	0	------
Ohio:											
Cincinnati	1	------	1	4	5	5	0	6	1	2	144
Cleveland	1	------	1	70	9	22	0	10	0	87	246
Columbus	1	------	0	0	3	1	0	1	0	18	99
Toledo	0	------	0	2	3	8	0	8	0	34	69
Indiana:											
Anderson	0	------	0	0	2	4	0	2	0	1	11
Fort Wayne	0	------	0	1	0	1	0	0	1	0	22
Indianapolis	0	------	0	0	13	2	0	4	0	4	132
South Bend	0	------	0	0	0	2	0	1	0	0	25
Terre Haute	0	------	0	0	0	0	0	0	0	0	32
Illinois:											
Alton	0	------	0	0	1	1	0	0	0	1	5
Chicago	18	2	1	9	44	87	0	47	2	100	792
Elgin	1	------	0	0	1	0	0	0	0	2	14
Moline	0	------	0	0	0	0	0	0	0	4	11
Springfield	0	------	0	0	2	4	0	0	2	1	46
Michigan:											
Detroit	5	1	0	8	8	41	0	21	2	124	304
Flint	0	------	0	1	3	3	0	1	0	2	32
Grand Rapids	0	------	0	0	0	2	0	0	0	4	34
Wisconsin:											
Kenosha	0	------	0	0	0	4	3	0	0	1	8
Madison	0	------	0	7	0	0	0	1	1	23	26
Milwaukee	1	------	0	12	9	26	0	2	0	31	119
Racine	0	------	0	0	2	5	1	2	0	0	18
Superior	0	------	0	0	0	3	0	0	0	0	8
Minnesota:											
Duluth	0	------	0	2	0	12	0	0	0	19	25
Minneapolis	0	------	0	22	7	10	0	1	0	1	163
St. Paul	0	------	0	16	5	2	1	3	0	14	89
Iowa:											
Cedar Rapids	0	------	------	1	------	2	0	------	0	5	------
Davenport	0	------	------	0	------	2	0	------	0	0	------
Des Moines	0	------	------	0	------	0	0	------	0	0	56

City reports for week ended July 11, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa—Continued.											
Sioux City	0			0		3	4		0	0	
Waterloo	2			0		0	0		0	0	
Missouri:											
Kansas City	2		0	1	6	16	0	4	1	1	86
St. Joseph											
St. Louis	3		0	9	5	12	0	3	3	15	212
North Dakota:											
Fargo	0		0	0	2	0	0	0	0	0	20
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	4
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	6
Nebraska:											
Omaha	3		0	2	12	6	1	3	1	3	78
Kansas:											
Lawrence	0	2	0	1	0	0	0	0	0	0	5
Topeka	0		0	1	0	6	0	0	0	0	18
Wichita	0		0	0	3	3	0	1	0	5	28
Delaware:											
Wilmington	0		0	2	2	0	0	0	0	4	80
Maryland:											
Baltimore	2	2	2	78	4	8	0	8	1	71	176
Cumberland	0		1	0	0	0	0	2	0	0	17
Frederick	0		0	0	0	0	0	0	0	0	4
District of Col.:											
Washington	8		0	51	15	1	0	10	0	33	173
Virginia:											
Lynchburg	0		0	1	0	0	0	0	0	7	5
Norfolk	0		0	2	2	0	0	0	0	1	26
Richmond	0		0	0	2	2	0	4	0	8	55
Roanoke	2		0	1	0	0	0	2	0	0	14
West Virginia:											
Charleston	0		0	0	1	0	0	1	0	1	15
Huntington	0			0		0	0		1	0	
Wheeling	1		0	4	1	0	0	0	1	0	15
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh											
Wilmington	1		0	0	0	0	0	2	0	0	16
Winston-Salem	0		0	0	0	1	0	1	1	0	9
South Carolina:											
Charleston	0	1	0	0	4	2	0	0	0	1	45
Columbia											
Florence	0		0	0		0	0		0	1	10
Greenville	0		0	2	0	0	0	0	0	0	11
Georgia:											
Atlanta	1		0	0	11	1	0	5	0	2	91
Brunswick	0		0	0	0	0	0	0	0	0	3
Savannah	1		0	0	0	0	0	1	0	0	35
Florida:											
Miami	0		1	2	1	0	0	1	0	2	23
Tampa	0		0	0	0	0	0	1	0	2	24
Kentucky:											
Ashland	0		0	0	0	0	0	0	0	0	0
Covington	0		0	3	2	0	0	0	0	0	14
Lexington	1		0	0	0	0	0	2	0	2	21
Louisville	2		1	0	6	3	0	5	0	2	90
Tennessee:											
Knoxville	0		0	2	1	0	0	1	2	0	20
Memphis	0		0	0	0	0	0	2	0	20	66
Nashville	0		0	2	1	0	0	0	0	0	52
Alabama:											
Birmingham	2		0	0	5	2	0	5	0	1	76
Mobile	0		0	0	0	1	0	1	2	0	16
Montgomery	1			0		1	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		1	0	
Little Rock	0		0	0	2	0	0	3	0	0	6
Louisiana:											
Lake Charles	0		0	0	1	0	0	0	0	0	2
New Orleans	4		0	1	10	3	0	11	3	14	140
Shreveport	1		0	1	2	0	0	3	4	0	41
Oklahoma:											
Oklahoma City	3	2	0	0	4	2	0	3	0	0	41

City reports for week ended July 11, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas:											
Dallas	2	1	1	17	2	7	0	4	0	3	77
Fort Worth	1	------	0	2	1	1	0	2	2	0	35
Galveston	0	------	0	0	2	0	0	1	0	0	13
Houston	4	------	0	0	7	0	0	7	2	0	91
San Antonio	1	------	0	0	3	0	0	7	0	0	77
Montana:											
Billings	0	------	0	1	0	1	0	0	0	0	12
Great Falls	0	------	0	0	0	0	1	2	0	0	11
Helena	0	------	0	0	0	5	0	0	0	0	2
Missoula	0	------	0	0	0	1	0	0	0	0	1
Idaho:											
Boise	0	------	0	0	0	0	0	0	0	0	9
Colorado:											
Colorado Springs	0	------	0	0	0	1	0	1	0	0	12
Denver	1	------	1	9	0	6	0	3	0	26	81
Pueblo	0	------	0	1	1	1	0	1	0	0	7
New Mexico:											
Albuquerque	0	------	0	2	4	2	0	5	1	0	21
Utah:											
Salt Lake City	0	------	0	3	1	14	0	0	1	11	31
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	1	42	2	0	0	8	2	11	86
Spokane	0	------	0	5	1	7	0	1	0	9	23
Tacoma	0	------	0	2	5	0	0	0	0	0	38
Oregon:											
Portland	0	------	0	1	5	4	0	0	0	20	58
Salem	0	------	------	1	------	0	0	------	0	2	------
California:											
Los Angeles	3	4	0	42	11	18	0	21	0	48	286
Sacramento	0	------	0	0	4	8	0	2	0	27	26
San Francisco	1	------	0	15	4	16	0	14	0	18	192

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
New York:			
Buffalo	0	1	0
New York	0	4	3
Rochester	0	1	0
New Jersey:			
Newark	3	1	0
Trenton	1	1	0
Ohio:			
Cleveland	2	0	0
Illinois:			
Chicago	3	2	3
Springfield	0	1	0
Michigan:			
Detroit	1	0	0
Flint	1	1	0
Iowa:			
Cedar Rapids	0	0	1
Missouri:			
St. Louis	3	1	0
Maryland:			
Baltimore	2	1	0
District of Columbia:			
Washington	2	0	0
West Virginia:			
Huntington	0	1	0
Wheeling	1	0	0

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
North Carolina:			
Wilmington	1	0	0
South Carolina:			
Greenville	0	1	0
Georgia:			
Atlanta	1	1	0
Kentucky:			
Ashland	2	0	0
Louisville	1	1	1
Tennessee:			
Memphis	1	0	2
Nashville	0	0	3
Alabama:			
Birmingham	2	0	4
Louisiana:			
Shreveport	0	1	0
Oregon:			
Portland	1	1	0
California:			
Los Angeles	2	1	0
Sacramento	0	0	1
San Francisco	0	0	1

Epidemic encephalitis.—Cases: Cleveland, 1; Toledo, 1; Washington, D. C., 1; Birmingham, 1.

Pellagra.—Cases: Boston, 2; Topeka, 1; Baltimore, 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 1; Memphis, 1; Birmingham, 4; Los Angeles, 1; San Francisco, 1.

Typhus fever.—Cases: Savannah, 1; Montgomery, 1. Deaths: New Orleans, 1.

FOREIGN AND INSULAR

CUBA

Vital statistics—1932.—Following are vital statistics for Cuba for the year 1932:

Population July 1, 1932	4,031,552
Marriages	12,076
Births	65,706
Births per 1,000 population	16.3
Stillbirths	5,500
Deaths	43,355
Deaths per 1,000 population	10.75
Deaths under 1 year of age	7,590
Deaths from—	
Alcoholism (acute and chronic)	11
Anthrax	8
Appendicitis	176
Bronchitis	1,322
Bronchopneumonia	3,249
Cancer	1,554
Cerebral hemorrhage	736
Cerebrospinal meningitis	3
Cirrhosis of the liver	462
Diabetes	192
Diarrhea and enteritis (under 2 years)	4,571
Deaths from—Continued.	
Diphtheria	144
Dysentery	71
Erysipelas	40
Hookworm disease	252
Influenza	209
Leprosy	26
Malaria	704
Measles	53
Nephritis, acute	576
Nephritis, chronic	1,516
Poliomyelitis	4
Puerperal septicemia	244
Scarlet fever	1
Suicide	575
Syphilis	162
Tetanus	183
Tuberculosis (all forms)	3,012
Typhoid fever	391
Whooping cough	

MEXICO

Anthrax.—According to information dated July 8, 1936, anthrax had appeared among cattle on several ranches located east of the city of Durango, Mexico, and south of the Santiago River. Up to July 3, 1936, 35 head of cattle had contracted the disease. The ranches have all been quarantined.

SWITZERLAND

Zurich—Poliomyelitis.—According to information dated July 9, 1936, 9 cases of poliomyelitis had been reported in the city of Zurich, Switzerland, including 1 case brought from an outlying district. All necessary precautions had been taken. During the week ended June 28, 1936, 7 cases were reported in the city of Zurich, Switzerland.

VENEZUELA

Vital statistics—1935.—The following table shows the births and deaths reported in Venezuela during 1935, together with the number of deaths reported from certain diseases.

Population (estimated, Jan. 1, 1935)	3,1[illegible]
Deaths	[illegible]
Death rate per 1,000 population	16.[illegible]
Births	91,[illegible]48
Birth rate per 1,000 population	28.77
Deaths from—	
Bronchitis	676
Cancer and other malignant tumors	593
Diarrhea and enteritis under 2 years	2,318
Dysentery	778
Erysipelas	67
Malaria	4,710
Measles	55
Deaths from—Continued.	
Meningitis	263
Nephritis	791
Pneumonia and bronchopneumonia	1,569
Poliomyelitis	5
Scarlet fever	8
Smallpox	3
Syphilis	397
Tetanus neonatorum	598
Tuberculosis, pulmonary	3,031
Typhoid fever	310
Whooping cough	467

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Week ended— April 1936				May 1936					June 1936			
						4	11	18	25	2	9	16	23	30	6	13	20	27
Ceylon:																		
Batticaloa [1] Provinces	C						14	4										
India	C	11,615	14,233	13,729	16,605	6,413	5,717	6,008	5,890	4,542	4,613	4,172	4,116					
	D	6,169	7,799	7,133	7,088	2,930	2,855	2,978	2,982	2,285	2,201	2,112	2,120					
Assam	C	707	318	92	59	20	19	45	53	75	124	115	98	157	86	98	41	37
	D	396	167	46	30	12	4	22	27	37	51	65	49	90	46	41	49	16
Bassein	C											3		6	6	3	1	2
Bombay Presidency	C	941	459	332	130	10	36	32	37	63	87	85	130					
	D	445	237	149	55	14	13	10	5	25	27	34	37					
Bombay	C														[2] 1			
Calcutta	C	103	110	330	802	245	171	230	153	161	192	268	225	166	191	133	180	76
Central Provinces and Berar	C	98	14	56	217	122	102	49	84	38	23	163	184	307	279	404	288	
Chittagong	C									4	1			1		7	1	5
Madras Presidency	C	2,855	3,870	2,877	2,751	442	463	404	368	265	221	292	346					
	D	1,336	2,013	1,407	1,340	189	226	192	151	146	116	158	187					
Madras	C	13	9	70	26	1	2	1	1		1	1						
	D	7	3	26	11			1										
Moulmein	C			2	10	1		1		1		2			1			
Negapatam	C	7	22	56	6	1	1											13
	D	4	8	27	2													9
Northwest Frontier Province	C		1	1														
Punjab	C	7	1				1	1	4	3	5	3	15	35	35	61	54	81
Rangoon	C		[2] 1				4									[2] 1		1
India (French):																		
Chandernagor Territory	C		8	6			2	3	1	1	1							
Karikal Province	C		116	91			1	3										
Pondichery Province	C		44	52	74			3	4	10	8							

[1] According to information dated Apr. 8, 1936, 31 cases of cholera with 27 deaths have occurred in the vicinity of Batticaloa, Ceylon.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Week ended— April 1936				May 1936					June 1936			
						4	11	18	25	2	9	16	23	30	6	13	20	27
Indochina (see also table below):																		
Bentre	C										1							
Pnom-Penh	C										1							
Siam:																		
Ang Thoang Province	C			3	6	5	1	3	2									
	D			3	4	2	1	2	1									
Ayudhaya Province	C	40	74	214	101	1	5	7	12	3	13	4		1				
	D	35	49	159	69	4	4	9	6	4	11	2						
Bangkok	C	49	124	375	148	18	11	17	13	20	8	11	3	10	8	6	10	12
Bejrpuri Province	C		56	66	42	14	13	6	4	7	1							
Bichitr Province	C				20	23	11											
Bismulok Province	C			13	106	14	4	49	6	40	20	4						
Chandapuri Province	C				15		4											
Chhaxoengsao Province	C	55	175	95	21	4	1	1	1	2		2						
Jalapuri Province	C	3	20	12	9	5			4	20	8	6						
Jayanad Province	C			13	11			6	13									
Kanchanapuri Province	C				11	8	1	11	7					2				
Lobpuri Province	C	10		7	2							1						
Nagara Nayok Province	C			10														
Nagara Pathom Province	C	1	4	11	43	6	17	3	1	2	2			1				
Nagara Rajsima Province	C			2														
Nagara Svarga Province	C			15	42	24	3	28	10	9	4	3		10				
Nondpuri Province	C	3	7	21	23	3	2	4	2	10	1							
Prachinpuri Province	C	54	26	4	3	1												
Prachuabgirikhand Province	C						14											
Pradhumdhani Province	C	1	4	41	21		1		4	13	8	5						
Prae Province	C				3													
Rajpuri Province	C	54	63	16	43	13	14	17	26	13		3						
Sarapuri Province	C		2	104	9													
Singhapuri Province	C	2	1	1				9	7	6		1						
Smudprakar Province	C	49	15	156	138	5	30	9	2	6	14	9						
Smudsagara Province	C	36	58	76	80	10	5		6	6		5						
Smudsongram Province	C	38	49	84	112	27	10	13	9	4								
Subarnpuri Province	C			13	48	14	12	11	9	2	7							

Upala Rajdhani Province	C				35					1		4						
Uttradhani Province	C				12													
Utradith Province	C				5	3	10	4		1	4							
On vessels:																		
S. S. *Egra* at Rangoon	C		1															
S. S. *Floristan* at Masulipatam	C		3 1															
S. S. *Chatala* at Rangoon from Chittagong	C				1													
S. S. *Kutsang* at Penang from Calcutta	C						1											
S. S. *Karagola* at Penang from Calcutta	C										1							

Places		January 1936			February 1936			March 1936			April 1936			May 1936		
		1–10	11–20	21–31	1–10	11–20	21–29	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indochina (French) (see also table above):																
Cambodia [4]	C	1		1	4	7		4	4	3		2			3	1
	D	1		1	3	1		4	3	3		1			2	1
Cochinchina [4]	C			2	2		3	3	4	1	4		1	1	1	1
	D			2	2		3	3	4	1	3		1	1	1	1

[3] Suspected.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Week ended—												
						April 1936				May 1936					June 1936			
						4	11	18	25	2	9	16	23	30	6	13	20	27
Algeria: Bone	C					3[2]												
Argentina (see also table below): Bahia Blanca (vicinity of)	C			2														
	D			2														
Azores. (See table below.)																		
Basutoland. (See also table below)	C			2[3]														
Belgian Congo	C											1						
Brazil. (See also table below).																		
British East Africa:																		
Kenya	C	25	10	22	9	7	3		1	8	2	21	5	1	2			
Tanganyika	C		7	2	5					3								
Uganda	C	61	44	41	62	9	8	16	24	23	17	43	42	28	31	16		
	D	54	40	42	58	9	8	15	23	22	16	42	40	28	29	16		
Ceylon:																		
Anuradhapura	C				1													
Colombo	C	11	10	6	3	1	1	1		2				1		3		
	D	10	9	3	3	1	1	1		2				1		3		
Plague-infected rats		4		2	3	2		1	5	2		1		5		2		
Hatton	C											3						
Manar	C							1										
Weligama	C						1											
Dutch East Indies: West Java	C	878	726	996	700	107	155	168	174	122								
	D	873	723	900	680	107	155	163	172	121								
Ecuador:																		
Daule[4]	C				1													
Guayaquil	C	20	8	6	1	1												
	D	4	6	3		1												
Plague-infected rats		5	2		1												1	2
Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P	P		P		P		P		P		P		
Asyut Province	C	3	6	9	13	4	5	7	2	1	1				2			
Girga Province	C		1	2	1	1							1					
Minya Province	C			4	5				1	1								
Suez	C														1			
Great Britain—England—Liverpool: Plague-infected rats		2																
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district:																		
Hamakua Mill		1		1														
Kukaiau		1																

[illegible]			1							[illegible]								
Pohakea Sector				1		1	1	2										
India	C	1,852	2,168	3,382	3,543	602	721	447	564	350	154	63	34					
	D	928	1,144	1,726	1,669	279	357	279	310	192	115	55	24					
Bassein	C	1		7	4	3		1	1		1	2	1	1	1	1		
Plague-infected rats				2														
Bombay Presidency	C	88	99	169	125	9	21	21	17	7	4							
	D	48	61	110	70	6	12	15	14	3	2		1					
Bombay	C		[5] 1														1	
Central Provinces and Berar	C	716	194	584	456	151	135	79	92	45	6	1						
Karachi	C				5													
Madras Presidency	C	71	42	29	41	10		5	5	1		2	2					
	D	51	26	11	38	5		5	3			1	1					
Punjab	C			1	14	8	22	54	11	56	1	8	7					
	D				7	4	16	28	5	36	1	7	3					
Rangoon	C	[5] 1		[5] 1							3		2				2	
Plague-infected rats		1		5	2								1					
Indochina (see also table below):																		
Longxuyen	C															1		
Pnom-Penh	C		1	1							1							
Saigon-Cholon	C		1						1									
Tanghai	C						2						4					
Iraq: Baghdad	C	1	[5] 1															
Madagascar. (See table below.)																		
Malta	C							3		1					3			
	D							2							1			
Peru. (See table below.)																		
Senegal. (See table below.)																		
Tunisia: Tunis—Plague-infected rats				2		1	1											
Union of South Africa	C	7	14	141	41		[6] 6				[6] 3		[6] 3		[6] 17		[6] 15	
Cape Province	C	2																
Orange Free State	C	1																
United States:																		
California:																		
Lassen County—Plague-infected squirrels															1	1		3
Modoc County—Plague-infected squirrels															P	4	7	[7] 2
Monterey County	C																	1
Santa Cruz County—Plague-infected squirrels																	21	[7] 29
Santa Rosa	C							1										
Ventura County—Plague-infected squirrels						1									P			
Idaho—Bonneville County—Plague-infected squirrels																P		7
Nevada: Elko County—Plague-infected squirrels											P							
Utah: Beaver County.[8]																		

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Includes 1 suspected case.
[4] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Daule and vicinity, Ecuador.
[5] Imported.
[6] For 2 weeks.
[7] During the week ended June 27, 1936, 3 lots of plague-infected fleas in Modoc County, and 7 lots of plague-infected fleas in Santa Cruz County, Calif., were also reported.
[8] Plague has been reported positive near Beaver, Beaver County, Utah, in a boy bitten by a ground squirrel June 24, 1936.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		December 1935	January 1936	February 1936	March 1936	April 1936	May 1936
Argentina (see also table above):							
Buenos Aires Province	C			2			
Cordoba Province	C	5	1				
San Luis Province	C					6	
Santa Fe	C		1				
Azores	C	2	3	4		2	
Basutoland	C	16					
Brazil:							
Bahia State	C	20					
Ceara State	C			7	54	3	
Pernambuco State	C				[9] 15		
Indochina (see also table above):							
Cambodia	C		1	2	1	1	1
Cochinchina	C		1			1	1
Madagascar (central region)	C	507	503	352	206	86	48
	D	455	487	358	196	95	47

Place		December 1935	January 1936	February 1936	March 1936	April 1936	May 1936
Peru	C	9	23	10	10	15	5
Arequipa Department	C		5				
Lambayeque Department	C	1	4	3			
Libertad Department	C		5	1	1	6	4
Lima Department	C	7	9	8	3	6	1
Callao	C		1	2	4	1	
	D		1	2	1	1	
Plague-infected rats					P		
Piura Department	C			5		2	
Trujillo Department	C				2		
Senegal:							
Dakar [10]	C		1	1			
	D		1	1			
Thies [10]	C						2
Tivaouane [10]	C	1				1	5

[9] From Jan. 1 to Mar. 16, 1936.
[10] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Week ended— April 1936, 4	April 1936, 11	April 1936, 18	April 1936, 25	May 1936, 2	May 1936, 9	May 1936, 16	May 1936, 23	May 1936, 30	June 1936, 6	June 1936, 13	June 1936, 20	June 1936, 27
Algeria:																		
Algiers Department	C			2														
Constantine Department	C							1							1			
Oran Department	C														1		5	
Angola. (See table below.)																		
Argentina (see also table below):																		
Corrientes Province	C				5													
Jujuy Province	C				7													
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil: Porto Alegre (alastrim)	C	27																
	D								3									
British East Africa:																		
Tanganyika	C		9	8	57						11	61	1					
Uganda	C		10	12	7													
British Somaliland	C	7	4	24								6	2	2	1	19		
British South Africa: Southern Rhodesia	C			1														
Canada:																		
Alberta	C		[1] 1	3	30	1				1	1					[1] 2		
British Columbia	C	2	2		[1] 1													
Ontario	C					[1] 1												
Ceylon: Colombo	C		1															
China (see also table below):																		
Amoy	C			3				1										
Canton	C					1												
Dairen	C			4	2	1		1	1	2	2	1						
Foochow	C	P	P	P	P			P		P				P				
Hangchow	C	1	3	15	8	2	1		2	2	2	2		1				
Hankow	C			4	1			2			1				1			
Hong Kong	C				6	4	2	1		1	1			3	2			
Nanking	C	43	16	41	38	21	9	10	39	27	12	18	10		1			
Shanghai	C	6	5	30	23	15	9	17	9	11	9	10	9	10	1	9	1	3
Swatow	C	1		2	1	2	2											
Tientsin	C	3			2		1						1					

[1] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 1-28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1-28, 1936	Week ended— April 1936 4	11	18	25	May 1936 2	9	16	23	30	June 1936 6	13	20	27
Chosen. (See table below.)																		
Colombia (see also table below)	C	32	68	13	88			[2] 30										
Bogota	C	3																
Dahomey. (See table below.)																		
Dutch East Indies: Palembang	C				1													
Ecuador. (See table below.)																		
Egypt: Provinces	C			2	5											1	1	
Eritrea	C			1	5			2										
Asmara	C							1										
France. (See table below.)																		
Great Britain: England and Wales—London and Great Towns	C									3		1						
Greece: Salonika	C		6	14	20	5	5	5	5	5	8	8	8	8	8			
Guatemala. (See table below.)																		
India	C	9,617	19,883	34,355	31,312	8,327	9,390	8,285	8,646	8,667	7,400	7,401	7,458					
	D	2,106	4,220	8,417	7,679	2,215	2,548	2,244	2,061	2,121	1,913	2,190	1,956					
Assam	C	163	116	798	321	57	60	32	70	36	112	35	34	53	33	13	32	17
Bassein	C		[3] 1															
Bombay Presidency	C	711	1,703	3,444	2,820	741	826	570	722	773	592	565	374	443	215	294		
	D	103	282	650	556	104	167	137	152	124	111	99	88	79	41	51		
Bombay	C	39	86	286	277	87	104	74	57	63	45	43	47	39	22	22	35	20
	D	21	49	149	157	46	65	45	39	40	31	24	38	22	14	12	29	13
Calcutta	C	88	270	1,603	1,305	503	383	288	318	200	126	100	77	64	70	133	40	32
	D	56	133	803	915	425	310	217	214	158	103	86	67	52	49	64	27	23
Central Provinces and Berar	C	893	1,266	2,652	2,109	461	913	561	891	661	563	665	585	569	403	389	308	
Chittagong	D		1	1					1									3
Cochin	C			21	7													
Karachi	C	11	17	77	28	13	7	11	5	6	5	3	1	4	2	1	1	
Madras Presidency	C	1,366	1,312	1,214	1,930	316	296	322	302	271	252	222	272					
	D	209	176	191	294	56	49	68	41	58	38	28	53					
Madras	C	5	3	3	12			1		1			3	1				
Moulmein	C	6	27	61	83	12	9	7	7	2	9	7	11	6	6	8	7	
Negapatam	C		3	2		1	2				1							
Northwest Frontier Province	C	7	26	50	1	3		16	2		5			6		5		11

Punjab	C	313	408	641	437	53	83	135	101	97	47	70	60	103	77	73	92	78
Rangoon	C	4	9	10	16	8	5	3	4				3	1	5		[3] 1	2
Sind State	C						21	43	26	71	51	45	26	53	72	17	63	41
Tuticorin	C	5																
Vizagapatam	C	9	36	39	19		1	1			3		1	1		1		1
India (French):																		
Chandernagor Territory	C		165	230			12	10	7	6	4							
Karikal Province	C		5					1	1									
Pondichery Province	C		13	4			1		1	1	1							
	D		7				1		1	1								
India (Portuguese)	C		1		9													
Indochina (see also table below):																		
Haiphong	C			1														
Pnom-Penh	C																1	
Saigon	C						1											
Tourane	C				1				1	1								
Iran	C	12	9	12	1													
Iraq	C	26	58	40	9	2	4	2	2	1	4		1	5		1		
Baghdad	C		1			1			1	1								
Basra	C							2	1									
Japan:																		
Kobe	C					1												
Moji	C			1	1													
Nagasaki	C							1										
Osaka	C				5									1				1
Yamaguchi Prefecture	C		1															
Yokohama	C													1				
Libya: Tripolitania	C		2															
Mexico (see also table below):																		
Chihuahua	C		1	1		2				2							2	
Guadalajara	D	16	13	46	39	9	13	8	3		4	5	5	4	1		3	2
Mazatlan	C			1	2													
Mexico, D. F.	C	5	4	11	12	10	4	3	3									
Monterrey	C			2	2				1									
San Luis Potosi	D				1													
Torreon	C	1	1		2													
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	427	84	549	1,697		[1] 162		[1] 217	343		84						
Lagos	C			2														
Niger Territory. (See table below.)																		
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C		875	70	46													
Peru. (See table below.)																		
Poland	C			1														
Portugal (see also table below):																		
Lisbon	C	8	3	5	5		1	1	1			1						
Oporto	C															1		

[1] For 2 weeks.
[2] For 3 weeks.
[3] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 1-28, 1935	Dec. 29, 1935-Jan. 25, 1936	Jan. 26-Feb. 29, 1936	Mar. 1-28, 1936	Week ended— April 1936				May 1936					June 1936			
						4	11	18	25	2	9	16	23	30	6	13	20	27
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C			8				10	2	1	4	1						
Sierra Leone	C	116	37	135	215		[1] 3		[1] 6		[1] 9							
Freetown	C	2		1			[1] 1				[1] 2							
Spain	C	1	20	12	15	20		2	2	3	3		2	4		21		
Straits Settlements: Singapore	C																[2] 1	
Sudan (Anglo-Egyptian)	C		3	5	12	2		1	3	13	2	2					4	1
Turkey. (See table below.)																		
Uruguay. (See table below.)																		

[1] For 2 weeks.

[2] Imported.

On vessels:

S. S. *Ekma* at Rangoon from Calcutta	1 case	Dec. 10, 1935
S. S. *Cape St. Francis* at Rangoon from Calcutta	1 case	Dec. 17, 1935
S. S. *Bankura* at Karachi	1 case	Jan. 4, 1936
S. S. *Jalgopal* at Rangoon from Aracan	1 case	Jan. 5, 1936
S. S. *Matua* at Suez from Calcutta	1 case	Jan. 21, 1936
S. S. *Khosrou* at Kamaran quarantine station	1 case	Feb. 15, 1936
S. S. *Karapara* at Rangoon from Calcutta	1 case	Mar. 9, 1936
S. S. *Egra* at Calcutta	1 case	Mar. 10, 1936
S. S. *City of Aukland* at Rangoon from Calcutta	2 cases	Mar. 15, 1936
S. S. *Khandalla* at Rangoon from Calcutta	1 case	Mar. 16, 1936
S. S. *Haishang* at Rangoon	1 case	Mar. 18, 1936

On vessels—Continued.

S. S. *Cranfield* at Madras from Calcutta	1 case	Mar. 27, 1936
S. S. *Hokuryo Maru* at Moji from Tientsin	1 case	Apr. 2, 1936
S. S. *City of Adelaide* at Colachel from Rangoon	1 case	Apr. 13, 1936
S. S. *Egra* at Rangoon from Calcutta	1 case	Apr. 13, 1936
S. S. *City of London* at Suez from Calcutta	1 case	Apr. 20, 1936
S. S. *Manipura* at Port Sudan from Calcutta	1 case	Apr. 23, 1936
S. S. *Kinagi Maru* at Moji from Shanghai	1 case	May 4, 1936
S. S. *Awaji Maru* at Nagasaki from Dairen	1 case	May 8, 1936
S. S. *Bhutan* at Kobe from Shanghai	8 cases	May 13, 1936
S. S. *Jinkai Maru* at Moji from Hongay	1 case	June 1, 1936
S. S. *Rohna* at Penang from Madras	1 case	June 11, 1936

Place		December 1935	January 1936	February 1936	March 1936	April 1936	May 1936
Angola	C		5	12			
Argentina (see also table above):							
Buenos Aires Province	C			4		7	12
Entre Rios Province	C			5	1		
Jujuy Province	C				7	3	3
Belgian Congo	C	54	456	227	198		
Bolivia	C	43	48	18	62	18	31
China: Manchuria—Harbin	C	1	1	3			7
Chosen	C	53	86	248	315	313	
Colombia (see also table above):							
Barranquilla	D			1	1		
Santa Marta	D			1			
Dahomey	C	11		13	11		
Ecuador: Guayaquil	C			1			
France	C	18	76	24	30		
Guatemala	C		2	14	2	5	1
Indochina (see also table above)	C	44	57	229	106	221	142
	D	3	3	31	15	30	19
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C			5	4	4	
Chiapas State	C		1				
Chihuahua State—Chihuahua	C				1		
Coahuila State—Torreon	C			1			
Colima State	C			1	1		
Guanajuato State	C		5		5		
Leon	C		1				
Jalisco State	C		109				
	D		28				
Mexico (see also table above)—Con.							
Jalisco State—Con.							
Guadalajara	C		85	115	70	39	
	D		24	5[illegible]	13	31	
Lower California	C			7			
Mexico State	C			2	4	6	
Mexico, D. F.	C		10	22	18	13	
Mexico City	C		9				
Morelos State	C				1		
Puebla State	C		2	9	2		
Puebla	C			8	2	1	
Quintana Roo	C				1		
San Luis Potosi State—San Luis Potosi	C				8		
Sonora State	C			1	1	1	
Tamaulipas State	C		8				
Tlaxcala State	D				1		
Morocco	C		9	1	2	15	6
Mozambique	C		3	1	2	5	
Niger Territory	C	43					
Nyasaland	C		3	50	1	3	
Peru	C		31	7	21	7	21
Portugal (see also table above)	C	74	10[illegible]		49	16	
	D	11	6		8		
Portuguese East Africa	C		3				
Salvador	C	12	32	43	13	39	48
Turkey	C		5	6	1	1	16
Uruguay	C		3				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 1–28, 1935	Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended— March 1936				April 1936				May 1936					June 1936		
					7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Algeria:																				
Algiers Department	C		4	31	7		53	4	31	26	15	5	21	11	38	2	8	3		74
Algiers	C		1												2	1	1	1		2
Constantine Department	C		25	60		10	21	15	22	16	6	18	5	34	8	9	5	5		14
Bone	C		1											1						
Constantine	C		3			1								2				1		
Philippeville	C																	1		
Oran Department	C		7	53		12			4	12	1	15		5	7			6		
Australia: Sydney	C		1											1						
Basutoland	C						[1] 3													
Bolivia. (See table below.)																				
Bulgaria	C		14	11					16	14		17								
Chile	C			430				[2] 235												
Santiago Province [3]																				
Valparaiso	C	37	12	29	2	1	2	3	1	4	6	1				1	1	8	1	
China:																				
Hankow	C							1		1		2				2		1		
Nanking	C									1										
Shanghai	C	3											1		1	1		3		
Tientsin	C			1	1						1			1		3		2		
Tsingtao	C	3		1				1									1			
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	1	1		2	3	1	2			1				1					
Asyut Province	C			7		1		1	1						2					
Beheira Province	C	12	28	52	33	31		39	40						28			35		
Cairo	C		1	11			1		3		2	1	5	1		2			1	
Dakahliya Province	C		1	35	4	3		7	6						15			9		
Gharbiya Province	C		46	78	49	37		45	33						32			27		
Girga Province	C		1						1											
Minufiya Province	C			30	9	2		7							2			2		
Port Said	C														1					

Qena Province	C			3	1			24	20						1			1		
Sharkiya Province	C		1	1	1	11		1							2					
Provinces	C	41	138	371	86	153	133		119	159	153	132	109	107	106	98	93	72	76	95
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	4	3	9	6	6	6	6	1	1	1	1	1	1	1	1	1	1	1	
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	1				1	4	2						1						
Hungary	C		3				7		2	2			1							
Iran	C	2	17	9		3	2	4	7	8	7	3	5	6	2	7	1	5	6	
Teheran	C		1		1	1	1	1	2	2	6	1								
Iraq	C	17	19																	
Irish Free State: Mayo County	C									2			1							
Japan	C		1																	
Latvia. (See table below.)																				
Lithuania	C		69	9	6			[1] 7		[1] 8		[1] 2			4			2	9	
Mexico (see also table below):																				
Mexico, D. F.	C	68	35	71	9	9	9	15	13	14	6	11								
San Luis Potosi	D			1																1
Morocco (see also table below)	C	12	39	37			3	2	4	1	29	5	5	13	4	1	5	2		3
Palestine: Haifa	C		3	2					1							7	1	1	1	[4] 9
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	230	382	671	126	153	144	196	134	129	113	143	148	139	104	110	86		85	45
	D	22	21	45	6	6	16	11	2	11	9	7	8	11	7	4	5		4	3
Portugal (see also table below): Oporto	C					1														
Rumania. (See table below.)																				
Straits Settlements: Singapore	C	2	3			1	1				1									
Syria: Beirut	C			[4] 2																
Trans-Jordan	C		6	11	2			4	5	5										
Tunisia:																				
Tunis	C	1	5			3	1	5	1	1	1	1	1	1		1			2	
Provinces	C	31	61	64	14	30	45	49	14	37	26	50	27	18	29	22	18	10	21	
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				

[1] For 2 weeks.
[2] For 4 weeks.
[3] A report dated Jan. 20, 1936, states that there were 305 cases of typhus fever with 58 deaths in Santiago Province, Chile, from Nov. 2–16, 1936.
[4] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		December 1935	January 1936	February 1936	March 1936	April 1936	May 1936
Bolivia	C	168	135	115	110	75	33
China: Manchuria—Harbin	C		1	5	9		33
Chosen	C	50	51				
Czechoslovakia	C		14	25	210	13	34
Finland	C				5	112	10
Greece (see also table above)	C	9	5	7	6	5	3
Guatemala	C	7	9	17	6	114	116
Latvia	C				5		
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C			5	5	5	
Durango State	C			1	1		
Guanajuato State	C		15		56	2	
Leon	C		7	16	20		
Mexico State	C			2	15	6	
	D			3			
Mexico, D. F.	C		86	73	52	40	
Mexico City	C		75			20	
	D		22				
Oaxaca State	C		1	2			
Mexico—Continued.							
Puebla State	C		1				
Puebla	C			2	3	3	
Queretaro State	C		3				
San Luis Potosi State: San Luis Potosi	C		8	6	6	3	
Tlaxcala State	C				1		
Morocco (see also table above)	C	13	45	39	7	15	26
Panama Canal Zone	C	1	2	1	1		
Peru	C		143	103	115	103	118
Portugal (see also table above)	C		1	1	1	1	
Rumania	C	210	572	635	[illegible]	1,587	
Turkey	C	35	42	31	53	71	39
Istanbul	C		5	4	4	1	1
Union of South Africa:							
Cape Province	C	73	36	57	29	28	
Natal	C	1	7	2	3	1	
Orange Free State	C	4	17	27	5	18	
Transvaal	C	12	1	13	2	3	
Yugoslavia	C		131	59	123	103	125

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 1-28, 1935	Dec. 29, 1935, Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Week ended— March 1936 7	14	21	23	April 1936 4	11	18	25	May 1936 2	9	16	23	30	June 1936 6	13	20
Bolivia: Santa Cruz Department.[1]																				
Brazil:[2]																				
Amazonas State	C							1					1		1	1				
Bahia State	C	1	2																	
Maranhao State	C																1			
Matto Grosso State	C	1	1	2	1					1		1								
Minas Geraes State	C	10	8	11	1		4	2		1	1		1			3	1	1		
	D	5	8	11	1		4	2		1	1		1			3	1	1		
Parana State [2]	C			9	1	7	5	6	1	2										
Sao Paulo State [2]	C	11	4	23	17	5	7	6	[3] 3				1	1	6	6	2	2	3	1
Colombia:																				
Boyaca Department	C			3																
Intendencia of Meta	C			3																
Dahomey:[4]																				
Gold Coast:																				
Koforidua	C										1									
Kumasi	C			1				1												
Prepr.wase	C									1										
Ivory Coast: Vavua	C								1											
Niger Territory: Fada N'Gourma	C										1									
Senegal:																				
Dakar	C	[5] 1																		
M'Bake	C	1																		
Thies	C																			1
Tivaouane	C																	1	1	
Sudan (French): Kayes.[6]																				

[1] Yellow fever has been reported in Bolivia as follows: For the month of February, 2 cases; March, 10 cases; April, 1 case, May, 1 case.

[2] Yellow fever has also been reported in Brazil as follows: Parana State, Feb. 16–25, 1936, 5 cases, 5 deaths; Sao Paulo State, no date given, 3 cases and 4 deaths. Mar. 24–31, 1936, 2 cases, 2 deaths.

[3] Includes 1 case of yellow fever reported in the city of Sao Paulo, Brazil.

[4] During the week ended July 11, 1936, 1 suspected case of yellow fever was reported at Dahomey.

[5] Suspected.

[6] During the week ended July 4, 1936, 1 suspected case of yellow fever with 1 death was reported at Kayes, French Sudan.

X

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen. ROBERT OLESEN *Chief of Division*

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PUBLIC HEALTH REPORTS

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ENCEPHALITIS VIRUS (ST. LOUIS TYPE)

Effect of Partial Specific Immunity Upon the Clinico-Pathologic Picture in Intracerebrally Inoculated White Mice

By CHARLES ARMSTRONG and R. D. LILLIE, *Surgeons, United States Public Health Service, National Institute of Health*

When normal white mice are inoculated, either intranasally or intracerebrally, with encephalitis virus (St. Louis type), the resulting clinico-pathologic picture usually is predominantly that of an encephalitis. The animals become listless and tremulous, are prone to sit on their hindquarters, rub their noses, and fall over backward. Others may be irritable and jump blindly, or run rapidly about the cage. Later, the front legs and neck usually lose the power of voluntary motion and the animal lies on its side, often making scratching or running movements with the hind legs. This stage tends to pass more or less rapidly to one of quietude with infrequent breathing, which may persist for a day or more. If the animal is stimulated, more or less vigorous movements of the legs and tail will usually result, indicating that the cord motor neurons are still capable of transmitting an impulse.

This clinical picture is in accordance with the predominantly cerebral localization of the lesions, as noted by Webster and Clow (*1*) and Lillie (table 4), and is especially understandable in the light of the virus distribution studies of the former. These authors have traced the posterior progression and multiplication of intranasally inoculated virus in mice from the olfactory lobes, where it was present after 24 hours, through the brain to the cord, which was reached only after an interval of about 4 days.[1] Thus the brain is subject to earlier and more prolonged exposure to the virus, and one might expect the symptoms (which usually appear in from 4 to 7 days) to point predominantly toward a cerebral localization, as is the case.

The authors wish to record here the fact that, when the same virus is intracerebrally introduced, in proper concentration, into partially immune mice,[2] a clinico-pathologic picture pointing to a predominant involvement of the cord, usually of the lumbar region, may result.

[1] Brodie (*2*) reports the finding of virus in the olfactory lobes as early as 2 hours after intranasal inoculation

[2] The mice were purchased in the open market

EXPERIMENTAL PROCEDURE

Armstrong (3) reported that 30 to 60 percent of mice which had withstood an intranasal inoculation of encephalitis virus (mouse brain) would survive an intracerebral inoculation of a dose of the virus, given after a lapse of 3 weeks, which was rapidly fatal to normal mice, and that those that died tended to live longer than the controls.

Many of the intranasally instilled animals which died following the second or intracerebral inoculation presented the predominantly cerebral picture described above. However, 20 to 50 percent of the mice which developed recognizable symptoms showed a flaccid paralysis of one or more legs (table 1). Usually one or both hind

TABLE 1.—*Occurrence of deaths and paralyses among 136 mice intracerebrally inoculated with 0.03 cc 1:7000 suspension of encephalitis virus 21 days following an intranasal instillation of the same virus (0.04 cc 1:430 suspension)*

Results	Deaths or paralyses by days following the second or intracerebral inoculation														Total	Average number of days	Survived
	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
																	Percent
Deaths (no paralysis noted)	[1] 4	[1] 2	[1] 2	3	12	20	14	4	3	4	1	1	---	1	63	6.8	31.5
Paralyses	----	----	----	----	11	12	8	1	3	---	1	---	---	---	36	6.4	-------
Deaths among paralyzed	----	----	----	----	1	1	2	3	---	1	---	2	---	---	10	8.3	72.2
	Controls																
Deaths among controls (no intranasal instillation)	----	----	----	16	12	10	----	---	---	--	---	---	---	---	38	4.4	0

[1] Excluded from calculations as not due to encephalitis virus.

legs became paralyzed and refused to respond to reflex stimulation, while the neck and front legs often either remained active or soon regained their function so that the animals would move rapidly about the cage with the flaccid hind legs dragging after them. Less often one or both front legs might be involved either alone or in combination with one or both hind legs. Such paralyzed animals might, after an interval, show partial to complete recovery, while in others the affected members remained completely paralyzed and the animal might live thus for weeks. Mice showing combined encephalitic and myelitic symptoms often die more or less promptly after the appearance of the paralyses.

INFLUENCE OF IMMUNITY

Paralyses of the hind legs alone are an extremely rare occurrence in intracerebrally inoculated normal mice. Dr. J. G. Wooley states that he has observed such paralysis a few times in some 8,000 mice inoculated for the serum-virus protection test. In one such instance

the brain was submitted for pathologic examination, but showed no leisons suggesting virus response. The possibility of a traumatic origin in these few cases cannot therefore be ruled out. Moreover, if, in the immunized mice, the intracerebral inoculation followed the intranasal inoculation by too long an interval, nearly all the animals tended to survive without symptoms It appears, therefore, that the predominantly cord type of response is dependent upon the presence of a rather narrow degree of immunity, which apparently tends to protect the brain but leaves the cord cells still vulnerable.

The simplest explanation of this fact would be that the intranasal inoculation, through a subclinical invasion of the brain cells, had resulted in a local type of immunity peculiar to the affected cells. That this is not the entire explanation, however, is indicated through attempts to produce the clinical picture of a myelitis following immunity induced by a subcutaneous injection of virus. Failure resulted in our earlier attempts because too long an interval was allowed to elapse between the subcutaneous and intracerebral inoculations. When the interval was reduced to 6 days, however, flaccid paralyses developed (table 2).

TABLE 2.—*Deaths and paralyses among mice intracerebrally or intranasally inoculated with encephalitis virus 6 days following a subcutaneous injection with the same virus (0 025 cc 1 10000 suspension*

Number of mice	Method of inoculation and dosage	Results	Deaths or paralyses by days following inoculation: 1	2	3	4	5	6	7	8	9	10	Survived
													Per cent
67	Intracerebrally (0 03 cc 1 7000 suspension)	Deaths with usual encephalitic symptoms	[1] 1	--	1	1	4	3	5	-	--	---	43
		Appearance of flaccid paralysis	---	---	---	--	4	1	4	1	---	---	
		Deaths among paralyzed mice	--	---	--	---	3	--	3	1	1	1	
29	Intranasally (0 03 cc 1 430 suspension)	Deaths—encephalitic symptoms	[1] 1	---	---	---	---	1	--	---	---	---	27
		Controls											
68	Intracerebrally (0 03 cc 1 7000 suspension)	Deaths—encephalitic symptoms.	---	---	1	13	41	11	1	---	1	---	0

[1] Death not due encephalitis.

The subcutaneous inoculation of virus which we employed certainly failed to produce recognizable cerebral symptoms, and it seems probable that the brain cells were not invaded. Moreover, if we assume that the susceptible brain cells had suffered a sub-clinical invasion of virus, it would be necessary to conclude that the same degree of local immunity was attained in 6 days following subcuta-

neous inoculation that required in the neighborhood of 3 weeks to develop following intranasal instillations in which the virus presumably reached the brain more directly by way of the olfactory tract.

That the brain in certain partially immune animals should tend to escape symptoms when virus is actually introduced into that organ, while the cord is relatively vulnerable, is the more remarkable because the trauma of the inoculation should favor the localization of the virus in the injured organ. However, that trauma may play a part in bringing about the peculiar clinical picture which we have described is indicated by the fact that we have, to date, failed to produce this picture by reinoculating partially immune mice by way of the nares from the sixth to eighteenth day following the immunizing injection.

Whether the immunity apparently necessary to give the predominantly cord symptoms can be attained through passive immunization is an interesting question. A test was therefore carried out by injecting, intraperitoneally, 5 groups of 10 mice each with amounts of immune monkey serum ranging from 0.5 to 0.037 cc on the day prior to and again on the day following the intracerebral inoculation of virus (0.03 cc 1:9000 suspension, table 3).

TABLE 3.—*Effect of passive immunization on intracerebrally inoculated mice*

Immune monkey serum diluted with equal parts saline intraperitoneally			Date of administering virus. 0.03 cc 1:9000, intracerebrally	Deaths by days following virus—encephalitic symptoms								Deaths attributed to virus	Average duration of life
Number of mice	Date and amount injected												
	May 14, 1936	May 16, 1936		1	2	3	4	5	6	7	8		
10	1 cc	1 cc	May 15, 1936	[1] 1	---	---	1	---	6	1	1	9	
10	0.5 cc	0.5 cc	do	---	---	--	1	1	[2] 7	---	1	10	6.1 days.
10	0 25 cc	0.25 cc	do	[1] 4	---	---	---	2	2	---	2	6	
10	0.15 cc	0.15 cc	do	---	---	---	4	4	2	---	---	10	
10	0.075 cc	0.075 cc	do	[1] 1	---	---	1	5	2	---	1	9	5.2 days
10	Controls	Controls	do	[1] 1	---	---	1	4	4	---	---	9	

[1] Excluded as not due to virus. [2] 1 mouse completely paralyzed before death.

All the mice developed the cerebral type of symptoms, and 1, in addition, was apparently completely paralyzed. All died. The antiserum employed was not of high potency and the results of the test do not justify conclusions as to the possibility of passive immunity influencing the localization of symptoms.

POSSIBILITY OF A MIXED VIRUS

We next investigated the possibility that our Freeman strain of virus might be a mixture of two viruses, the slower acting of which had a special affinity for the cord cells of mice, such as that described by Theiler (*4*). In order to test this assumption, the cords from mice showing recent hind-leg paralysis were removed, macerated in saline, and inoculated intracerebrally into normal and partially immune

mice. The normal mice died with the clinico-pathologic picture of encephalitis, and the mice partially immunized through intranasally inoculated Freeman virus developed cord symptoms no more frequently than was the case when "brain" virus was employed.

Thus it appears that the cord involvement is due to the same virus that affects the brain, and that an intranasal or subcutaneous inoculation of a group of mice may result in a variable immunity which, in certain instances, tends to protect the brain against an intracerebral inoculation of virus while leaving the cord relatively susceptible. The pathologic findings support this contention (table 4).

The reason that the brain is apparently more readily protected than the cord is, possibly, that the cord cells of mice are actually the more susceptible but tend to be less affected in normal mice following an intranasal or intracerebral inoculation because the brain is first, and often fatally, affected before the more distant cord is involved. We have demonstrated that, while apparently somewhat slower in developing effective resistance to the virus of encephalitis than the brain cells, cord cells of mice may be rendered resistant even to direct inoculation. Twelve mice immunized by 2 intranasal instillations of virus were, together with 12 normal mice, inoculated directly into the vertebral canal with 0.03 cc 1:10000 suspension of virus. None of the immunized mice developed cord symptoms, one died of unknown cause, while seven of the controls developed cord paralyses and died. The fact that five escaped is probably due to inoculation failures.

Pathology

Brain and spinal cord were studied in 26 mice in which paralyses were observed before death and in 25 controls in which definite flaccid paralyses were not seen. The individual protocols are summarized in table 4.

Cord lesions were definitely absent in 12 of the nonparalytic group, slight in 7, moderate in 5, and marked in 1, and were present in all of the paralyzed mice, scant in 1, slight in 9, moderate in 12, and marked in 4.

In the cord the reaction was largely confined to the gray substance. Diffuse, focal, and perivascular proliferation of small round and elongate mesoglia cells was conspicuous, particularly in the anterior horns. Small vessels in the gray substance, and less often in the white, presented sheath proliferation and infiltration by lymphocytes. Anterior horn cells were often reduced in numbers, replaced by vacuoles or sometimes oxyphil, coagulated and necrotic. Massing of rod cells about vacuoles and cells was seen, less often accumulation of ameboid glia cells. A few polymorphonuclears were present in the gray substance of the anterior horn in one mouse.

Table 4.—*Correlation of spinal-cord lesions with paralysis in mice infected with the St. Louis encephalitis virus*

NONPARALYZED

Pathology no.	Day	Inoculation route	Paralysis in— Fore legs	Paralysis in— Hind legs	Reaction in brain	Reaction in cord	Cord lesions: Congestion	Hemorrhage	Oedema	Tigrolysis	Focal and P.V. gliosis	Diffuse gliosis	Perivascular lymphocytosis	Neuron necrosis	Neuronophagia	Reduction in neurons
7960	8	Ic	−	−	++	−										
7961	6	Ic	−	−	++	−										
7962	6	Ic	−	−	+	−										
7963	8	Ic	−	−	+	±					±		±			
7964	5	Ic	−	−	±	?A				+				?		
7965	6	Ic	−	−	+	−										
7966	6	Ic	−	−	+	−										
7967	5	Ic	−	−	±	±					±		±			
7968	5	Ic	−	−	+	?									±	
7970	5	Ic	−	−	+	−										
7971	5	Ic	−	−	+	+					+		+			
7972	5	Ic	−	−	+	−		+		+						
7978	4	Ic	−	−m	±	±				±	±		±			
7979	5	Ic	−	−m	±	−			+							
7980	5	Ic	−	−m	+	+					+		+			
7981	5	Ic	−	−m	+	±							±			
7982	5	Ic	−	−m	++	+					+		+	+?		
7986	4	Ic	−	−m	±	++				+	+	+	+	++	±	
8178	0	Is	−	−	C	C	+		+	+						
8302a	7	Sci	−	−	−	−										
8302b	7	Sci	−	−	−	−										
9381	3	Ic	−	−m	+	+					+		+			
9390	3	Ic	−	−m	+hPy	±		±			±		±			
9423	7	In	−	−	+	+L					+	+	+			
9426	7	In	−	−	+	−										

PARALYZED

Pathology no.	Day	Inoculation route	Paralysis in— Fore legs	Paralysis in— Hind legs	Reaction in brain	Reaction in cord	Cord lesions: Congestion	Hemorrhage	Oedema	Tigrolysis	Focal and P.V. gliosis	Diffuse gliosis	Perivascular lymphocytosis	Neuron necrosis	Neuronophagia	Reduction in neurons
7949	10	Ic		+	+	++			+	+	+	++	++	+		
7950	10	Ic		+	±G	±					±		±	±		
7951	10	Ic		+	++	+L						+	+		+	+
7983	6	Ic		+	+	+					+	+	+	+	+	
7984	6	Ic		+	±	±c++L				+	++	+	+	+	+	
8573	5	Is		+	±	±	+	+					+	±		
8475	6	Ic		+	+	+				±	+	+	+		?	
8476	6	Ic		+	+	+c++L				+		++	+	+	±	
8477	6	Ic		+	±	+cL				+	+	+	++	+	+	
8579	4	Ic		+	±	+			+		+	+	+	±		
8580	4	Ic		+	+	+			+	+	+	++	++	±		
8618	4	Is		+	++	±				+		±	±	+	+	
8610	4	Is		+	±	±				±	±		±			
8623	5	Is		+	±	+				±	+		+			
8624	5	Is		+	+	±	±			±			±			
8625	5	Is		+	+	+				±		±				+
9380	3	Ic	+	−	+	±					±		±			
9391	3	Ic	+	+m	++	+					+	±	+	−	−	
9422	7	Ic	+	+	+	+					++		+	−	−	
9424	7	Ic	+	+	+	±				−	−		±	−	−	
9425	7	Ic	+	+m	++	+				−	+		+	−	−	
9583	5	Ic		+	±	+				+	+	+	+	−	−	
9709	19	Ic		+Lt	±	∓						±				
9710	19	Ic		+	±	±L					±	±				
9711	19	Ic		+	±	++				+	+	++	+			+
9712	19	Ic	+	−	±	±C						±	±	±		

M = Observed when moribund.
Ic = Intracerebral.
Is = Intraspinal.
In = Intranasal.
Sci = Intrasciatic.
? = Questionable.
A = Autolysis.

C = Congestion.
+C = Positive cervical.
+L = Positive lumbar.
+Lt = Positive left side.
G = Complicating granulomatous encephalitis.
Py = Pyogenic complication.

h = Hemorrhage.
− = No reaction.
∓ = Very scanty reaction.
± = Slight reaction.
+ = Average reaction.
++ = Marked reaction.

Cellular gliosis and perivascular lymphocyte infiltration were present alone or combined in all of the paralytic group, and in about half of the nonparalytic. Nerve cell destruction, neuronophagia, or both, were seen in half of the paralyzed mice; questionable or slight amounts of necrosis in two, slight neuronophagia in one, and well-marked cell destruction and neuronophagia in one of the nonparalytic group. The last mouse was killed when in a moribund condition 4 days after intracerebral inoculation.

In five mice the reaction was recorded as more severe in the lumbar level. All these mice showed hind-leg paralysis. In one the reaction was more marked in the cervical level and the paralysis was in the forelegs. In the remainder no great difference was discerned in the extent of the changes in the various levels studied.

In general, the cerebral reaction was somewhat more pronounced in the nonparalytic group than in the paralyzed mice; and when differences in intensity of reaction between brain and cord were observed, the cord lesions tended to be more marked than the cerebral in the paralytic animal, whereas the reverse was true in the nonparalytic group.

SUMMARY

1. Normal mice, when intracerebrally inoculated with the St. Louis type of encephalitis virus, usually developed a clinico-pathologic picture pointing predominantly to a brain localization.

2. Partially immune mice, when intracerebrally reinoculated, after a suitable interval, with a proper dose of virus, tended to develop symptoms and pathology pointing predominantly toward a cord localization. The pathology is that of a destructive inflammation of the gray substance.

3. We have failed to produce the predominantly myelitic symptoms when the second inoculation was made by the intranasal route.

4. The paralyses may be permanent or undergo variable to apparently complete recovery.

5. The above observations are probably best explained by assuming that cord cells of mice are relatively more susceptible to the virus of encephalitis than are the brain cells and therefore require a higher degree of immunity to afford protection when once the cord is reached by the virus. The possibility of a difference in response by brain and cord cells to active immunization cannot, however, be ruled out.

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THE PRIMARY PNEUMONIAS OF INFANTS AND CHILDREN[1]

By JESSE G. M. BULLOWA, M. D., *Clinical Professor of Medicine, New York University Medical College, Visiting Physician, Harlem Hospital*, and EVELYN GREENBAUM, *Statistical Secretary, Littauer Pneumonia Research Fund, Harlem Hospital Station*

I. AGE DISTRIBUTION, FATALITY RATES, AND RELATION OF CHARACTER OF INVOLVEMENT TO FATALITY IN 1,000 CHILDREN

There are several studies giving the statistics of the sex and age distribution of pneumonias in children compiled from death certificates. These include the terminating pneumonias of pertussis, measles, and other exanthemata.

The cases studied herein are, with few exceptions, the primary pneumonias which appeared in the pediatric service of a large municipal hospital in patients either as brought from their homes by ambulance or discovered in the out-patient department or emergency ward during the period from July 1, 1928, to January 1, 1934. In New York City the exanthemata and their complications are taken to contagious disease hospitals. A very few (at most 1 percent) of the pneumonias of this series may have been post-exanthematous. If they were, they occurred a number of days after discharge from the contagious disease hospital and, accordingly, came to the general hospital.

These patients were studied on the pediatric service of Dr. Morris Gleich, to whom we are indebted for cooperation in making the observations.

DIAGNOSTIC CRITERIA

Immediately on admission, patients with acute respiratory infections are referred to our pneumonia service. The methods of study and criteria for diagnosis are stated here for comparison with other series. The clinical diagnosis of pneumonia is based on definite physical signs of pneumonia confirmed by fluoroscopy and (or) radiography or postmorten examination. No attempt was made to establish a diagnosis of lobular pneumonia as distinct from lobar and bronchopneumonia. Involvement of a single lobe or lung was regarded as evidence of lobar pneumonia. General mottling of the radiographic lung fields was seen in most of the bronchopneumonias. When there were in both lungs scattered areas of bronchial breathing or cry and crepitations, and a typical febrile course with hurried breathing, some cases were regarded as bronchopneumonia, though the X-ray showed

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[1] From the Littauer Pneumonia Research Fund of New York University Medical College and the Medical Service of Harlem Hospital, Department of Hospitals, and the Bureau of Laboratories, Department of Health, New York City. This study received support in part from the Metropolitan Life Insurance Co. and from the Commonwealth Fund

Thanks of the authors are extended to Mrs Sophia M. Robison, of the Welfare Council of the City of New York, for population data.

no opacities. Several pediatricians, as well as clinicians of the pneumonia service, agreed in establishing the diagnosis in the cases included as pneumonia. Where the diagnosis of pneumonia was questioned, the cases were excluded from the series.

BACTERIOLOGICAL CRITERIA

The bacterial etiology was determined by (1) pharyngeal culture or laryngeal culture (at times with a laryngoscope) taken by causing the children to cough and collecting the expelled mucous on a sterile swab. The swab was placed in broth, incubated 3 hours, and then injected into the mouse peritoneum for later Sabin typing. The etiology of any resulting septicemia in the mouse was studied in its heart or brain. (2) Blood cultures were taken in all sick children; from the jugular vein in infants and the anticubital veins in older children. (3) A transthoracic aspiration of pulmonary exudate (lung suction) was done in all patients with lobar pneumonia and in some bronchopneumonias. Throat swabbings, lung suctions, and blood cultures frequently were repeated if the temperature continued high and no type had been discovered on the first attempt.

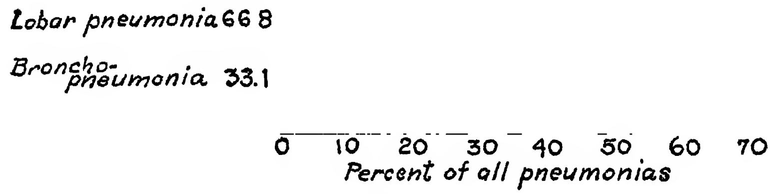

FIGURE 1.—Distribution of pneumonia according to type among children under 12 years of age

DISTRIBUTION BY TYPE

In 1,000 children with the diagnosis lobar or bronchopneumonia, admitted from July 1928 to January 1934, there were 668 cases classified as lobar pneumonia, 331 cases as bronchopneumonia, and 1 case was unclassified.

CASE FATALITY

The case fatality rate was much higher among the bronchopneumonias, 98 deaths in 331 cases, or 29.6 percent, than among the lobar pneumonias, 72 deaths in 668 cases, or 10.8 percent (fig. 2). In part this seems to have been due to the fact that most cases and most deaths occurred in the younger age group, where the bronchopneumonias are most frequent. In the first 12 months of life there were, for all types of pneumonia, 321 cases, or 32 percent; in the second 12 months, 199 cases, or 20 percent; in the third, 106 cases, or 10 percent;

and, after that, the number of cases fell rapidly. The number varied between 63 and 47 (average, 53), 7 percent, from the fourth through the seventh year, averaged 30 cases each in the eighth and ninth years,

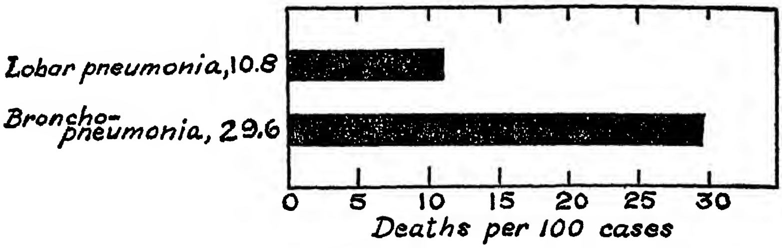

FIGURE 2.—Case fatality of lobar pneumonia and bronchopneumonia among children under 12 years of age.

was 20 in the tenth and dropped to 14 in the twelfth year. In the first year of life, with 32 percent of the cases, the case fatality was more than 35 percent; between the ages of 1 and 2 years, with 20 percent of the cases, the case fatality was 11½ percent; at 2 years of age, with a little more than 10 percent of the cases, the fatality was a little over 10 percent; and after that the case fatality rate averaged approximately 5 percent. These data are shown in figure 3, which gives the age distribution of pneumonia cases and the fatality at each age.

CHARACTER OF PNEUMONIA

When the cases were divided into lobar pneumonia and bronchopneumonia, and into those under 2 years and those over 2 years, it was found that 39.5 percent of the lobar pneumonias occurred in the

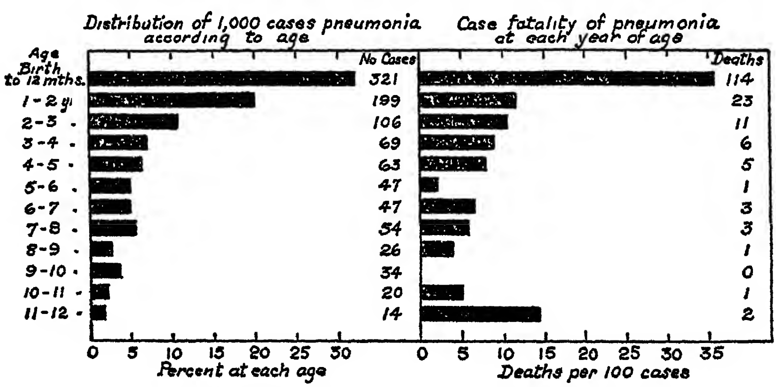

FIGURE 3.—Cases and case fatality of pneumonia in children under 12 years, by age.

infants under 2 years, with a case fatality of 18.6 percent, and that 77 percent of the bronchopneumonias occurred under 2 years of age, with a case fatality almost twice as high, or 34.5 percent. Of the

lobar pneumonias, 60.5 percent occurred above 2 years as compared with 23 percent of the bronchopneumonias, and the case fatality in the bronchopneumonias was 13.2 percent above 2 years of age, while in the lobar pneumonias it was only 5.7 percent. It will be seen that the bronchopneumonias are almost twice as fatal as the lobar pneumonias in the infants under 2 years and that the percentage of the total cases of all ages that were less than 2 years of age was almost twice as high as in lobar pneumonias. Though the bronchopneumonias are also about twice as fatal after 2 years of age, the percentage that occur at these ages is less than for lobar pneumonia. This may be influenced in part by the more frequent occurrence of streptococcus infection in the infants (see table 1).

TABLE 1.—*Fatality of hospitalized cases of lobar and of bronchopneumonia among children under 12 years of age*

Age	Lobar pneumonia				Bronchopneumonia			
	Number of cases	Percent of cases	Number of deaths	Deaths per 100 cases	Number of cases	Percent of cases	Number of deaths	Deaths per 100 cases
All ages under 12 years	668	100.0	72	10.8	331	100.0	98	29.6
Under 2 years	264	39.5	49	18.6	255	77.0	88	34.5
2 to 12 years	404	60.5	23	5.7	76	23.0	10	13.2

Our bacteriological studies lead us to divide the cases into the pneumococcus pneumonias (which are separately considered) and the nonpneumococcus pneumonias, which include those from which a pneumococcus was not recovered (some of which may have been due to pneumococci), and from which were obtained various streptococci (most frequently), staphylococci, or other organisms, or no growth at all. The cases invaded by several different pneumococci and by pneumococci and other organisms are given in the following report on pneumococcus pneumonias:

There were 539 pneumococcus pneumonias, 53.9 percent of the cases, with 83 deaths, or a case fatality of 15.4 percent, and 461 cases not due to pneumococci, 46.1 percent, with 87 deaths, or a case fatality of 18.9 percent. The distribution of these 2 groups are given according to age in table 2, and the fatality rates by year of age are given in table 3. It is important to observe that, as children grow older, both the number of nonpneumococcic pneumonias and their proportional frequency diminish. Pneumococcus pneumonias are more frequent than the nonpneumococcus pneumonias at all ages except under 1 and at 3 years. With very few exceptions, the fatal nonpneumococcic pneumonias occurred before the fifth year.

Table 2.—*Distribution of hospitalized cases of pneumonia according to type for children at each year of age under 12 years*

Age	All pneumonia		Pneumococcus pneumonia		Nonpneumococcus pneumonia	
	Number of cases	Percent	Number of cases	Percent of all types	Number of cases	Percent of all types
All ages under 12 years	1,000	100.0	539	53.9	461	46.1
Birth to 12 months	321	100.0	146	45.5	175	54.5
1–2 years	199	100 0	116	58.3	83	41.7
2–3 years	106	100.0	58	54.7	48	45.3
3–4 years	69	100.0	33	47.8	36	52.2
4–5 years	63	100.0	34	54.0	29	46.0
5–6 years	47	100.0	30	63.8	17	36.2
6–7 years	47	100.0	32	68.1	15	31.9
7–8 years	54	100.0	30	55.6	24	44.4
8–9 years	26	100.0	15	57.7	11	42.3
9–10 years	34	100.0	20	58.8	14	41.2
10–11 years	20	100 0	14	70.0	6	30.0
11–12 years	14	100.0	11	78.6	3	21.4

Table 3.—*Fatality of hospitalized cases of pneumococcus and nonpneumococcus pneumonia at specific ages under 12 years*

Age	All pneumonia			Pneumococcus pneumonia			Nonpneumococcus pneumonia		
	Number of cases	Number of deaths	Deaths per 100 cases	Number of cases	Number of deaths	Deaths per 100 cases	Number of cases	Number of deaths	Deaths per 100 cases
All ages under 12 years	1,000	170	17.0	539	83	15.4	461	87	18.9
Birth to 12 months	321	114	35.5	146	49	33.6	175	65	37.1
1–2 years	199	23	11.6	116	14	12.1	83	9	10.8
2–3 years	106	11	10.4	58	7	12.1	48	4	8.3
3–4 years	69	6	8.7	33	3	9.1	36	3	8.3
4–5 years	63	5	7.9	34	2	5.9	29	3	10.3
5–6 years	47	1	2.1	30	1	3.3	17	0	0.0
6–7 years	47	3	6.4	32	3	9.4	15	0	0.0
7–8 years	54	3	5.6	30	1	3.3	24	2	8.3
8–9 years	26	1	3.8	15	1	6.7	11	0	0.0
9–10 years	34	0	0.0	20	0	0.0	14	0	0.0
10–11 years	20	1	5.0	14	0	0.0	6	1	16.7
11–12 years	14	2	14.3	11	2	18.2	3	0	0.0

CASE FATALITY AND AGE

Of the nonpneumococcus pneumonias, 56 percent occurred in the first 2 years of life, while 48 percent of the pneumococcus pneumonias occurred during that period. During this age period the mortality was higher, 28 percent, in the nonpneumococcus pneumonias than among the pneumococcus pneumonias, 24 percent.

The high incidence of pneumonias in infants under 1 year of age in our admission raised the question of whether more infants suffered from pneumonia, or whether the high admission rate was due to the greater number of these children in the community.

Table 4 shows that the accepted experience of greater pulmonary susceptibility of tiny infants is supported by a comparison of the number of cases of pneumonia admitted to Harlem Hospital by year,

or groups of several years of age and the number of children in the population alive at these ages.

TABLE 4.—*Incidence of pneumonias in children from Jan. 1, 1929, to Jan. 1, 1932*

Age	Average number of children with pneumonia admitted to Harlem Hospital over a 3-year period from Jan. 1, 1929, to Jan. 1, 1932	Number of children alive in the health areas served by Harlem Hospital at the time of the 1930 census	Incidence per 1,000 population
Under 1 year	54	5,801	9.3
1-4 years [1]	75	23,170	3.3
5 years [1]	7	5,947	1.2
6 years [1]	7	5,727	1.2
7-9 years [1]	17	17,038	1.0
10-13 years [1]	5	20,913	.2

[1] Age, last birthday

It has been assumed that the proportion of children afflicted with pneumonia admitted to Harlem Hospital to the total number afflicted in the area from which Harlem Hospital draws, is the same at the different age groups.

The incidence of admissions to Harlem Hospital was three times as frequent in the first year as it was in the next 4-year period. In the period under 1 year it was almost nine times as frequent as in any year after the age of 4 (table 4).

SUMMARY

There are given the age distribution, case fatality, and the relationship of character of the pneumonic involvement to fatality in 1,000 children entering the pediatric service of a general hospital as pneumonia patients.

CONCLUSIONS

1. Bronchopneumonia occurred most frequently in infants, and is more fatal than lobar pneumonia in infants and children.
2. Nonpneumococcus pneumonias were more frequent and more fatal in infants than in older children.
3. Infants are afflicted with pneumonia much more frequently than older children.

II. CASE FATALITY BY SEX AND AGE DISTRIBUTION

The very marked preponderance of males suffering from primary pneumonias admitted to our adult pneumonia service led us to reinvestigate the sex distribution of the pneumonias in children. It had been suggested that the difference in sex incidence among adults is due to differences in their exposures and occupations. Some other

or additional explanation must be offered, such as a difference in hormones or configuration, if the preponderance of pneumonia among the males extends to earliest infancy.

TABLE 1.—*Sex distribution of hospitalized primary pneumonias compared with the sex distribution of children in the health areas served by the hospital. (Pneumonia cases admitted to Harlem Hospital from July 1, 1928, to Jan. 1, 1934, and 1930 census of health areas)*

Age in years	Pneumonia cases in Harlem Hospital					Population of the health areas served by the hospital				
	Number of cases			Percent of cases		Number of children			Percent of children	
	Both sexes	Male	Female	Male	Female	Both sexes	Male	Female	Male	Female
All ages under 14	1,030	627	403	60.9	39.1	78,596	39,152	39,444	49.8	50.2
Under 1	321	194	127	60.4	39.6	5,801	2,921	2,880	50.4	49.6
1–4	437	262	175	60.0	40.0	23,170	11,625	11,545	50.2	49.8
5	47	29	18	61.7	38.3	5,917	2,943	2,974	49.7	50.3
6	47	30	17	63.8	36.2	5,727	2,845	2,882	49.7	50.3
7–9	114	69	45	60.5	39.5	17,038	8,566	8,472	50.2	49.8
10–13	64	43	21	67.2	32.8	20,943	10,252	10,691	49.0	51.0

For the 1,030 cases of pneumonia seen between July 1, 1928, and January 1, 1934, at Harlem Hospital the sex distribution for specific ages is given in table 1, compared with the sex distribution of children in the health areas served by Harlem Hospital as given in the 1930 census. It is quite evident that, though there is approximately an equal distribution of the sexes in the general population, the markedly disproportionate selection of males by pneumonia occurs in children of every age including infants under 1 year. In no age group was the proportion of boys to girls affected with primary pneumonia less than 60 to 40, and in one age period, from 10 to 13 years, it was in the proportion of 67 to 33.

TABLE 2.—*Case fatality of hospitalized primary pneumonias in Harlem Hospital among males and females*

Age in years	Males		Females		Difference (female rate minus male rate)	Standard error of difference
	Deaths per 100 cases	Standard error	Deaths per 100 cases	Standard error		
All ages under 14	16.3	±1.5	18.2	±1.9	1.9	±2.4
Under 2	25.8	±2.4	27.2	±3.1	1.4	±3.9
2–13	6.1	±1.4	8.1	±2.0	2.0	±2.4

More male children were invaded by pneumonia, but the case fatality rate was apparently a little higher among the females. There were proportionately more deaths among the females under

as well as over 2 years of age. The rates and their standard errors are shown in table 2. The differences are not as great as their standard error and therefore have no statistical significance. On the basis of our present experience, the difference in fatality of the sexes is insufficient to assert that, though female infants are less susceptible to pneumonia, they succumb more readily after it is established.

SUMMARY AND CONCLUSION

The distribution and case fatality in 1,030 children suffering from pneumonia is considered in relation to age and sex. A preponderance of cases was found among males but no significant difference between the sexes with respect to fatality could be demonstrated.

MORTALITY FROM AUTOMOBILE ACCIDENTS AMONG CHILDREN IN DIFFERENT GEOGRAPHIC REGIONS OF THE UNITED STATES, 1930 [1]

Studies on the Fatal Accidents of Childhood No. 1

By WILLIAM M. GAFAFER, *Senior Statistician, United States Public Health Service*

Since the widespread use of the automobile considerable and increasing attention has been given to the loss of life caused by it. The material dealing with the subject generally makes reference only to the total number of lives lost during some definite period of time in the entire country or in some selected area, and only occasionally is mention made of the loss of life suffered in broad age groups. It is the purpose of the present paper, the first of a series, to investigate the mortality of children caused by automobile accidents in different geographic regions of the United States with the use of data from published volumes of the Bureau of the Census specific for single years of age under 5, and for the age groups 5 through 9, and 10 through 14 years. The time of exposure is limited to the year 1930 principally because it is the most recent year for which accurate population enumerations exist.

Subsequent papers will consider, among other things, the various other important causes of the fatal accidents of childhood in different geographic regions, and available comparable data will make it possible to study time changes in the relative mortality from fatal accidents for 1925 to 1932, inclusive.

[1] From the Office of Child Hygiene Investigations, U. S. Public Health Service.

FATAL ACCIDENTS IN THE DEATH REGISTRATION AREA OF 1930

Table 1 shows for the death registration area of 1930 for the year 1930 the relation among children of the mortality from automobile accidents to the mortality from other accidents, and for further comparative purposes the mortality is included from 3 common communicable diseases, namely, measles, scarlet fever, and diphtheria. A comparison of the various data discloses a number of illuminating facts. Thus, in the year 1930, fatal accidents from all causes claimed 22,044 children under 15 years of age while the 3 diseases caused the death of 10,629, or a ratio of over 2 deaths from accidents to 1 from the 3 diseases. Only for infants of 1 year is the ratio less than 1. The leading cause of death from accidents changes with age. For infants under 1, mechanical suffocation ranks first, and the rate of 40.7 per 100,000 is of the same order as the mortality from measles (39.6). For infants of 1 and 2 years of age the leading cause of death among accidents is definitely burns, the rate for the latter age being similar to the death rate from measles. At age 3 burns and automobiles are of similar importance, either one of which may be considered as the leading cause. The combined mortality is comparable to the mortality from diphtheria. At age 4 the mortality from automobile accidents (19.2) ranks first and is not significantly different from the rate for age 3 nor from the rate for the age group 5–9. When the single ages under 5 are combined, the mortality from burns leads with the rate from automobile accidents immediately following it. While the death rate from automobile accidents holds first place among the rates for the different accidents in the age groups 5–9 and 10–14 years, the rate for the younger age group is almost twice that for the older.

FATAL AUTOMOBILE ACCIDENTS IN DIFFERENT GEOGRAPHIC REGIONS

For the purposes of this paper the death registration States of 1930, consisting of 47 States and the District of Columbia, have been divided into 4 broad groups, each group constituting a geographic region, as follows: A Northeastern (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the District of Columbia), a North Central (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, West Virginia, and Wisconsin), a Southeastern (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Virginia), and a Western

(Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming). Table 2 shows for these regions the age distribution of the population under 15 years of age. The white and colored are shown separately only for the Southeastern region. The percentage distribution indicates the similarity of the age composition of the children in the different regions.

TABLE 1.—*Deaths in 1930 from different accidents and from three communicable diseases among children under 15 years of age, death registration area of 1930, white and colored combined*

Cause of death	Age in years								
	All ages	Under 1	1	2	3	4	Under 5	5-9	10-14
	Deaths per 100,000 children								
Automobile [1]	14.1	6.8	8.4	11.8	17.6	19.2	12.9	18.3	10.9
Burns [2]	8.0	9.7	21.9	20.4	17.8	16.0	17.2	5.5	1.9
Drowning	5.6	1.5	9.2	5.9	3.6	3.0	4.6	4.9	7.1
Traumatism by fall	3.6	7.2	6.0	5.6	4.2	3.2	5.2	3.1	2.8
Poisoning [3]	3.0	7.6	13.9	8.8	4.7	3.0	7.5	1.1	.7
Mechanical suffocation	2.6	40.7	.8	.04	--------	.1	7.9	.1	.2
All other	27.0	41.8	26.0	27.5	29.8	29.6	30.9	27.9	22.4
All accidents	63.9	115.3	86.2	80.0	77.7	74.1	86.2	60.9	46.0
	Number of deaths								
Automobile [1]	4,871	141	173	262	403	434	1,413	2,200	1,258
Burns [2]	2,768	203	452	454	406	361	1,876	670	222
Drowning	1,908	32	190	132	82	67	503	585	820
Traumatism by fall	1,250	150	123	124	96	72	565	369	316
Poisoning [3]	1,035	159	288	196	109	69	821	128	86
Mechanical suffocation	905	849	16	1	--------	2	868	14	23
All other	9,307	871	538	611	680	671	3,371	3,363	2,573
All accidents	22,044	2,405	1,780	1,780	1,776	1,670	9,417	7,329	5,298
	Deaths per 100,000 children								
Measles	10.0	39.6	50.9	21.5	10.6	7.1	25.2	4.4	1.3
Scarlet fever	5.3	5.5	9.5	10.2	11.0	8.6	9.0	5.3	1.9
Diphtheria	15.5	22.3	36.4	36.7	33.8	27.4	31.4	13.6	2.5
Total	30.8	67.4	96.8	68.4	55.4	43.1	65.6	23.3	5.7
	Number of deaths								
Measles	3,444	827	1,050	477	243	161	2,758	536	150
Scarlet fever	1,829	114	197	226	250	194	981	635	213
Diphtheria	5,356	465	752	817	773	621	3,428	1,637	291
Total	10,629	1,406	1,999	1,520	1,266	976	7,167	2,808	654

[1] Includes railroad and street car collisions. "Automobile" includes motor trucks and motor busses.
[2] Conflagration excluded.
[3] Includes attacks by venomous animals, food poisoning, absorption of poisonous gas, and other acute accidental poisonings.

Table 2.—*Number of children under 15 years of age by geographic region, death registration States of 1930 (census of 1930)*

Age in years	Region											
	North-eastern	North central	Southeastern			Western	North-eastern	North central	Southeastern			Western
			Total	White	Colored				Total	White	Colored	
	Percentage distribution						Number of children					
All ages under 15	100.0	100.0	100.0	100.0	100.0	100.0	9,077,276	11,393,362	9,713,198	6,906,911	2,806,287	3,091,909
Under 1	5.8	6.1	6.2	6.3	5.9	6.1	580,168	690,057	604,338	439,233	165,100	188,152
1	5.9	6.1	6.0	6.2	5.6	6.0	587,723	691,526	533,485	426,570	156,915	185,275
2	6.4	6.5	6.6	6.6	6.4	6.3	636,667	736,778	636,773	456,361	180,412	195,352
3	6.5	6.6	6.8	6.9	6.8	6.5	651,586	750,586	661,677	474,792	189,885	201,012
4	6.5	6.5	6.7	6.7	6.6	6.6	645,659	746,602	648,969	462,725	186,244	202,854
Under 5	31.1	31.8	32.3	32.7	31.3	31.5	3,100,803	3,621,520	3,135,245	2,259,689	878,556	972,645
5	6.8	6.9	7.1	7.1	7.1	6.9	680,582	780,264	689,059	490,607	198,452	214,538
6	6.9	6.8	7.1	7.1	7.4	7.0	684,693	784,115	696,501	489,670	206,831	215,834
7	6.8	6.8	6.9	6.8	7.0	6.9	679,433	775,172	669,966	472,909	196,957	213,686
8	7.2	7.2	7.3	7.3	7.3	7.3	713,370	824,957	707,367	501,447	205,920	226,678
9	7.0	7.0	6.9	6.9	6.7	7.2	701,584	792,752	666,713	478,662	188,051	220,770
5–9	34.7	34.7	35.3	35.2	35.5	35.3	3,459,647	3,961,290	3,429,603	2,433,355	996,221	1,091,506
10	7.0	6.8	7.0	6.9	7.2	6.9	701,744	772,659	681,707	478,146	203,561	213,930
11	6.6	6.5	6.1	6.3	5.8	6.5	661,572	715,935	596,068	434,059	162,609	202,170
12	7.2	6.0	6.7	6.5	7.1	6.8	712,831	723,109	646,329	447,753	198,576	210,887
13	6.7	6.6	6.1	6.1	6.3	6.4	609,557	747,400	593,904	417,394	176,510	198,372
14	6.7	6.7	6.5	6.3	6.8	6.6	671,122	763,443	627,339	436,485	190,851	202,399
10–14	34.2	33.5	32.4	32.1	33.2	33.2	3,416,826	3,815,543	3,145,347	2,213,537	931,510	1,027,758

The mortality caused by automobile accidents among children in the year 1930 is classified according to geographic region in table 3 and presented graphically in figure 1. The mortality from measles, scarlet fever, and diphtheria has been added to the figure for purposes of comparison. The graph reveals two waves; one is formed by the automobile rates and the other consists of the rates yielded by each of the three diseases. The peak of the latter wave is evident at 1 year; the peak of the former is present 3 years later. The order of the regions with respect to the magnitude of the mortality from automobile accidents changes with advancing age. A significance test applied to the rates given in table 3 to determine the probable order of the regions with respect to decreasing magnitude of mortality indicates that for under 1 year and for 1 year of age the North Central and the Western regions together occupy first place, while the Northeastern and Southeastern are bracketed for second place. For age 2, age 3, and for the age group 10–14 the order remains unchanged excepting that the Northeastern region moves to first place, thereby joining the North Central and the Western regions. For age 4 the Northeastern and Western regions hold first place; the rate for the North Central is significantly lower than the rate for the Northeastern but not significantly different from the Western; and the rate for the Southeastern is the lowest of all regions. For the age group 5–9, the Northeastern region leads, with the North Central and Western second and the Southeastern last.

TABLE 3.—*Deaths in 1930 from automobile accidents*[1] *among children under 15 years of age, by geographic region, death registration States of 1930, white and colored combined*

Region	Age in years								
	All ages	Under 1	1	2	3	4	Under 5	5-9	10-14
	Deaths per 100,000 children								
All regions [2]	14.1	6.7	8.3	11.8	17.7	19.1	12.9	18.1	10.9
Northeastern	17.4	5.5	6.5	12.9	22.7	25.9	15.1	24.7	12.2
North Central	14.8	8.3	11.3	12.4	18.8	20.5	14.4	18.7	11.2
Southeastern	9.1	4.1	5.1	8.5	10.5	10.5	7.9	10.8	8.4
Western	16.1	12.2	13.5	17.4	21.4	20.2	17.1	18.1	13.1
	Number of deaths								
All regions [3]	4,811	138	171	261	402	429	1,401	2,166	1,244
Northeastern	1,741	32	38	82	148	167	467	856	418
North Central	1,690	58	78	91	141	153	521	741	428
Southeastern	881	25	30	54	70	68	247	371	263
Western	499	23	25	34	43	41	166	198	135

[1] Includes railroad and street car collisions. "Automobile" includes motor trucks and motor busses.
[2] Excluding the colored children of the Southeastern region, the rates by age are 14.7, 7.2, 8.9, 12.5, 18.7, 20.2, 13.7, 19.1, and 11.2, respectively.
[3] Excluding the colored children of the Southeastern region, the number of deaths by age are 4,627, 138, 168, 253, 389, 415, 1,363, 2,086, and 1,178, respectively.

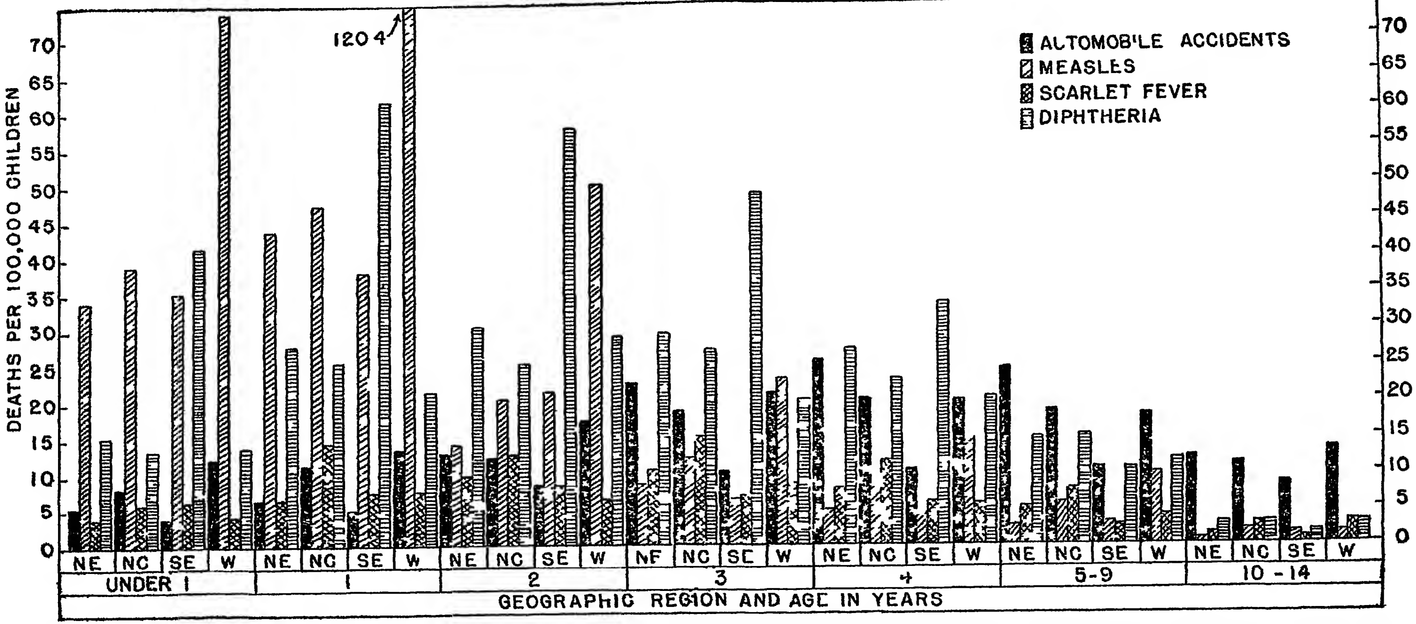

FIGURE 1.—Mortality in 1930 from automobile accidents and three communicable diseases by geographic region (Northeastern, North Central, Southeastern, and Western) and age, in the death registration States of 1930 white and colored combined

This is not the place to compare the mortality from the three diseases with respect to geographic region and age. However, before leaving figure 1 certain pertinent comparisons will be made concerning the fatal effects of automobile accidents and the diseases. Up to and including age 4 and for each region, with the possible exception of the Western children of age 3, the mortality from diphtheria exceeds the mortality from automobile accidents. Indeed, up to age 3 the mortality from the diseases commands the picture. At age 3 a transition apparently takes place, when the mortality from automobile accidents tends to exceed the effects of the diseases. At age 4 the mortality from the former is for each region greater than the mortality from measles or scarlet fever. At 5–9 and 10–14 years the transition is complete, and is particularly evident at 10–14.

FATAL AUTOMOBILE ACCIDENTS IN RELATION TO THE NUMBER OF REGISTERED AUTOMOBILES AND GASOLINE CONSUMED

The application of a probability test for significance to the mortality rates for children under 15 years of age (table 3) to determine the probable order of the regions with respect to decreasing magnitude of mortality leads to the same conclusion as indicated above for age 4. Thus, the Northeastern (17.4) and the Western (16.1) regions hold first place, the rate for the North Central (14.8) is significantly lower than the rate for the Northeastern but is not significantly different from the Western, and the rate for the Southeastern (9.1) is the lowest of all regions. The facts may be tabulated as follows (rates not significantly different are bracketed):

Northeastern	17.4
Western	16.1
North Central	14.8
Southeastern	9.1

This order of the regions, however, is disturbed when another measure of mortality is chosen, namely, the number of deaths under 15 years of age per 100,000 registered automobiles.[2] When this calculation is made, the Western region assumes the position occupied by the Southeastern, that is, last place, and the Southeastern moves to second place. The order, together with the mortality per 100,000 registered automobiles (column *a*), is as follows:

	(*a*)	(*b*)
Northeastern	24.4	20.5
Southeastern	22.1	18.8
North Central	16.4	15.8
Western	13.5	12.1
All regions	19.1	17.1

This order remains unchanged, but, obviously, not necessarily, when the number of deaths in the absence of mileage data is related to

[2] Includes passenger automobiles, taxis, busses, motor trucks, and road tractors

an approximate measure of the miles covered by the automobile. Thus when rates are calculated as deaths per 50 million gallons of gasoline consumed, the results are as indicated in column *b* of the table above. The reason for the change in the original order of the regions is that the Western region has more automobiles in relation to the number of children; and there is no change in the order when gallons of gasoline are substituted for automobiles, since the number of gallons consumed per automobile varies but little in the different regions.[3]

SUMMARY

This, the first paper of a series on the fatal accidents of childhood, deals with the mortality from automobile accidents among children in different geographic regions of the United States for the year 1930. Mortality from automobile accidents when compared with the mortality from other accidental causes in the death registration area varies in importance with age. Considering all fatal accidents, mechanical suffocation leads at under 1 year of age, burns at 1 and 2 years, automobile accidents and burns at 3, and automobile accidents at 4, 5–9, and 10–14. Under 15 years of age there were 22,044 deaths from all accidents and 10,629 deaths from measles, scarlet fever, and diphtheria.

Mortality from automobile accidents in four geographic regions is compared, and further comparisons are made with the mortality from the three common communicable diseases mentioned above. The four regions consist of groups of States forming a Northeastern region, a North Central, a Southeastern, and a Western.

The order of the regions with respect to decreasing magnitude of the mortality from automobile accidents changes with increasing age. For deaths per 100,000 children under 15 years of age, for example, the order is as follows: Northeastern (17.4), Western (16.1), North Central (14.8), and Southeastern (9.1). This order changes when another measure of mortality is employed, namely, deaths per 100,000 registered automobiles. The order then becomes: Northeastern (24.4), Southeastern (22.1), North Central (16.4), and Western (13.5). This last order remains unchanged when the measure, deaths per 50 million gallons of consumed gasoline, is used; the rates are, respectively, 20.5, 18.8, 15.8, and 12.1.

ACKNOWLEDGMENT

Acknowledgment is made to the Bureau of Public Roads, United States Department of Agriculture, for supplying, by State, the number of automobiles registered and the number of gallons of gasoline consumed by automobiles.

[3] The number of automobiles per child by region follows: Western, 1.20, North Central, 0.91; Northeastern, 0.72, Southeastern, 0.41; all regions, 0.74. The number of gallons of gasoline consumed per automobile: Northeastern, 595; Southeastern, 589, Western, 557, North Central, 519, all regions, 557.

AN UNUSUAL CASE OF BUBONIC PLAGUE

Dr. W. M. Dickie, director of public health of California, has recently reported an unusual case of pestis minor, the details of which were furnished by Dr. Harlin L. Wynns, chief of the State bureau of epidemiology.

The case occurred in an 11-year-old boy living in an isolated section of Monterey County, Calif., 28 miles north of San Simeon.[1] While cleaning a brush rabbit on June 13, the patient cut his right thumb on a bone. No infection developed locally, but on June 16 he complained of pain in the right axilla and was not feeling well. On June 17 the patient had headache and considerable pain in the axilla and was taken to the hospital—temperature 104° F., pulse 96, respiration 22, prostrated and toxic, swelling in right axilla. On June 18 the temperature was 105.6°. Smear from bubo apparently showed bipolar organisms. Blood was inoculated into guinea pigs. On June 19 the patient was much improved, with temperature 103.8°. On June 20 the maximum temperature was 103°; bubo was definitely palpable and tender. From this time on the patient showed gradual improvement, and on June 23 the temperature was normal. On June 25, guinea pig inoculated with blood taken on June 18 died, and smears from organs showed many typical bipolar organisms.

Because of the mildness of the case there was some reluctance to consider it definitely plague until after the guinea-pig-inoculation test. The patient was acutely ill only about 3 days, and the febrile period lasted only 6 days.

Ground squirrels and brush rabbits are plentiful in the locality, but the patient denied recently shooting any ground squirrels, although his dog frequently brought them in. Ticks are plentiful, and the patient had been bitten by one 4 days before he became ill. To the date of the report (July 22, 1936) plague-infection had not been proved in ground squirrels in this area, but the State laboratory reports that specimens of fleas from the locality have been found positive for plague by animal inoculation.

SUCCESSFUL RAT CONTROL ON VESSELS

The tremendous advances in recent years in the control of rats on ships have attracted the universal attention of quarantine officers, so much so that within the last year or two the prediction has appeared in more than one quarter that the control of the ship rat was virtually accomplished. As a strict matter of fact, this is not quite true, as at least 10 percent of vessels are still rat-infested to a material degree It is true, however, that the great majority of vessels visiting United

[1] Case reported in the Public Health Reports for July 10, 1936, p 939

States ports are either rat-free or have achieved the control of rats to the point where the infestation is not a sanitary menace.

It is extremely interesting to note that a similar state of affairs exists at the great port of London, England, as shown by the following quotation from the annual report for the year 1935 of the port medical officer of health, Dr. C. F. White:[1]

"There is no doubt that article 28 of the International Sanitary Convention, 1926, has achieved a great reduction in the rat population in ships. The proportion of exemption certificates to deratization certificates is increasing, and the average number per ship of rats killed by fumigation is decreasing. There is an increasing interest in, and appreciation of the value of, ratproofing both in ships and ashore, and I think it may be claimed that the spread of plague by sea-borne commerce has been almost stopped. Unfortunately, this does not mean that there can be any relaxation of rat-repressive measures. Rats are adaptable and prolific, and rapidly breed up to the limits of the rat harborage and the food supply. They promptly take advantage of every circumstance which is even temporarily in their favor. Fumigation, trapping, and poisoning are but palliatives. The only treatment which holds out any prospect of lasting relief from rat infestation is ratproofing both in ships and on shore in ports. The principles of ratproofing are perfectly simple, and their practical application is not costly if carried out at the time ships and buildings are constructed. This is gradually being realized by those who build and those who operate ships, and by those responsible for the construction and maintenance of buildings in ports, but the importance of attention to small details is not appreciated. Efficiency in ratproofing really depends upon care in detail, for rats can pass through small openings, and the points they select for gnawing their way into harborage or from one compartment to another are just those out-of-way corners which are most likely to escape observation, and most awkward for the men who are carrying out the ratproofing to work in."

NEED FOR DIFFERENTIATION BETWEEN PARALYTIC AND NONPARALYTIC CASES OF POLIOMYELITIS

In the Public Health Reports for January 10, 1936 (p. 43), it was noted that effective January 1, 1936, the State of Massachusetts required a differentiation between paralytic and nonparalytic poliomyelitis in cases reported to the department of public health.

The matter of distinguishing between paralytic and nonparalytic cases has also received the attention of the Permanent Committee of the International Office of Public Health, as shown by the following statement in the summary of the proceedings of the May (1936) session of the Committee:[2]

[1] Annual Report of the Medical Officer of Health for the Port of London for the Year Ended Dec 31, 1935, p. 21.

[2] Bulletin Mensuel, June 1936, p. 1006, Office International d'Hygiene Publique Reprint, p. 16.

"The fact that certain countries (Denmark, the United States) have included nonparalytic cases in the statistics of poliomyelitis morbidity has introduced confusion in these statistics; the number of reported cases has been thereby considerably increased and the fatality rate decreased. The proposal has been made to the Committee to determine whether it would be possible to report separately in each country paralytic cases and nonparalytic cases; the question is submitted to the delegates with a view to study in the approaching session. It has already been reported to the Committee that, in Sweden, for example, the proportion of nonparalytic cases which are recognized varies greatly with epidemics."

INCREASED MORTALITY DUE TO HIGH TEMPERATURES IN THE MIDWEST

The death rate from all causes in 86 large cities for the week ended July 18 was 17.0 per 1,000 population [1] (annual basis), as compared with 11.9 for the preceding week and 10.5 for the week ended July 4. For the week ended July 25 the rate had dropped to 11.0. The weekly Health Index for the week ended July 18, 1936, states:

"The sharp increase in mortality for this week results from the extreme heat wave in midwestern States. There were 12,183 deaths (in the 86 large cities) this week and only 7,439 in the corresponding week in 1935. This represents an increase of 4,744 deaths, or 64 percent. From the standpoint of mortality the heat wave of 1936 was much more severe than the heat wave of 1934." [2]

The death rates for 86 large cities for recent weeks, and a comparison with rates for corresponding weeks of 1935, are given below:

Week ended—	1936	Corresponding week of 1935	Rate for year to date	
			1936	1935
July 4	10 5	10 2	12.8	12 1
11	11.9	10 7	12 8	12 1
18	17.0	10 4	13.0	12 0
25	11.0	10 3	12 9	11 9

[1] Weekly Health Index of the Bureau of the Census

[2] For a discussion of high temperatures and increased mortality in the summer of 1934, see article by Selwyn D Collins in the Public Health Reports for Aug 31, 1934, p 1015

DEATHS DURING WEEK ENDED JULY 18, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 18, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	12,183	7,349
Deaths per 1,000 population, annual basis	17.0	10.4
Deaths under 1 year of age	651	486
Deaths under 1 year of age per 1,000 estimated live births	59	45
Deaths per 1,000 population, annual basis, first 29 weeks of year	13.0	12.[illegible]
Data from industrial insurance companies:		
Policies in force	68,609,012	67,924,936
Number of death claims	10,691	11,092
Death claims per 1,000 policies in force, annual rate	8.1	8.5
Death claims per 1,000 policies, first 29 weeks of year, annual rate	10.4	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 25, 1936, and July 27, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 25, 1936, and July 27, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935
New England States:								
Maine	1			1	30	75	0	1
New Hampshire	3				2		0	0
Vermont					7	32	0	0
Massachusetts	8	6			272	105	2	3
Rhode Island	2	3			5	53	0	0
Connecticut		9			32	68	0	1
Middle Atlantic States:								
New York	27	8	[1] 2	[1] 1	351	699	10	11
New Jersey	7	8	1	1	165	160	0	3
Pennsylvania	10	16			234	242	6	6
East North Central States:								
Ohio	5	27	7	5	50	243	1	6
Indiana	12	9	15	21	4	20	2	4
Illinois	21	25	3	6	13	161	5	6
Michigan	13	8		4	19	315	1	5
Wisconsin		3	20	24	52	380	0	1
West North Central States:								
Minnesota	4			1	7	33	0	1
Iowa	4	4		1		15	0	4
Missouri	5	10	6	13	5	21	0	0
North Dakota					4	46	0	0
South Dakota	1				1	9	1	0
Nebraska	1	1			5	13	1	1
Kansas	2	3		2	4	50	0	3
South Atlantic States:								
Delaware	1	2			2	13	0	0
Maryland [2 3 4]	9	5	1		77	10	5	0
District of Columbia	2	11	1		38	5	1	4
Virginia [3]	4	16			42	60	2	5
West Virginia	5	11		16	4	21	0	2
North Carolina [3 4]	14	13	1	8	3	12	0	0
South Carolina	4	2	19	46	2	2	0	0
Georgia [4]	10	10					0	0
Florida [4]	3	6	3			1	4	0
East South Central States:								
Kentucky	4	3	2		27	40	10	1
Tennessee	11	5	9	18	8		0	1
Alabama [4]	7	26		3	8	12	2	2
Mississippi [3]	7	11					0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 25, 1936, and July 27, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935
West South Central States:								
Arkansas	3	2	5	3	--------	2	0	0
Louisiana	9	14	5	13	6	9	2	1
Oklahoma [5]	5	2	2	16	1	5	0	3
Texas [4]	17	35	23	10	34	14	0	2
Mountain States:								
Montana [2]	--------	4	--------	9	5	15	0	1
Idaho [3]	1	--------	2	--------	10	2	0	0
Wyoming	--------	2	--------	--------	--------	7	0	0
Colorado	1	10	--------	--------	2	12	0	1
New Mexico	5	2	1	--------	32	--------	1	0
Arizona [2]	3	2	10	--------	20	5	2	0
Utah [2]	--------	--------	--------	--------	7	5	0	0
Pacific States:								
Washington	1	1	--------	--------	52	60	1	0
Oregon	--------	--------	5	11	8	46	0	0
California	26	19	6	20	155	223	8	7
Total	278	354	140	251	1,808	3,333	67	86
First 30 weeks of year	14,273	16,969	141,160	103,251	267,442	690,871	5,766	3,946

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935
New England States:								
Maine	1	0	9	18	0	0	0	0
New Hampshire	0	0	--------	4	0	0	0	1
Vermont	0	0	5	4	0	0	1	0
Massachusetts	1	9	47	27	0	0	25	3
Rhode Island	0	1	6	2	0	0	2	0
Connecticut	1	5	7	15	0	0	3	2
Middle Atlantic States:								
New York	6	44	120	151	0	0	14	8
New Jersey	1	5	26	--------	0	0	2	2
Pennsylvania	3	4	100	141	0	0	10	15
East North Central States:								
Ohio	1	6	44	65	0	0	6	22
Indiana	2	2	31	30	0	2	2	15
Illinois	7	4	80	153	6	0	11	29
Michigan	6	8	76	65	1	0	5	15
Wisconsin	0	1	75	75	5	1	8	1
West North Central States:								
Minnesota	0	0	25	36	3	1	0	24
Iowa	0	1	19	26	28	5	0	2
Missouri	0	0	13	18	5	0	15	25
North Dakota	0	0	3	7	1	0	2	4
South Dakota	0	0	6	6	1	2	0	0
Nebraska	0	0	12	10	0	5	1	0
Kansas	2	2	32	18	0	2	3	26
South Atlantic States:								
Delaware	0	0	2	1	0	0	0	0
Maryland [2 3 4]	0	2	13	14	0	0	1	12
District of Columbia	0	6	5	6	0	0	2	6
Virginia [3]	0	87	7	18	0	0	18	36
West Virginia	1	0	11	17	0	0	9	22
North Carolina [3 4]	0	52	15	17	0	1	24	46
South Carolina	0	6	--------	3	0	0	9	25
Georgia [4]	2	2	5	6	0	0	35	33
Florida [4]	0	1	1	4	0	0	1	5

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 25, 1936, and July 27, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935	Week ended July 25, 1936	Week ended July 27, 1935
East South Central States:								
Kentucky	2	10	13	17	0	0	29	37
Tennessee	17	9	9	10	0	0	52	44
Alabama [4]	39	4	10	8	0	0	20	31
Mississippi [2]	3	2	3	8	0	0	16	16
West South Central States:								
Arkansas	0	0	3	2	0	2	14	20
Louisiana	1	1	4	3	0	0	37	27
Oklahoma [5]	0	0	3	11	0	0	33	41
Texas [4]	0	1	10	14	0	3	47	31
Mountain States:								
Montana [3]	1	0	13	-------	10	3	2	3
Idaho [3]	1	0	3	1	2	1	0	0
Wyoming	0	0	6	19	0	9	0	0
Colorado	0	0	7	20	0	0	6	1
New Mexico	1	1	5	4	0	0	18	14
Arizona [3]	0	0	1	1	0	0	0	0
Utah [2]	0	1	5	14	0	0	1	0
Pacific States:								
Washington	3	0	19	10	2	14	2	3
Oregon	0	0	16	17	0	3	5	3
California	13	21	67	93	0	1	6	10
Total	117	298	993	1,211	64	55	492	669
First 30 weeks of year	940	1,897	180,919	177,048	6,107	5,221	5,203	6,961

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended July 25, 1936, 14 cases, as follows: Maryland, 4; Virginia, 2; North Carolina, 4; Montana, 2; Idaho, 1; Arizona, 1.
[4] Typhus fever, week ended July 25, 1936, 53 cases, as follows: Maryland 2; North Carolina, 2; Georgia, 33; Florida, 4; Alabama, 7; Texas 5.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1936										
Alabama	11	27	33	416	14	62	15	13	0	46
California	22	127	2,231	8	5,618	11	18	1,054	13	68
Georgia	8	28	23	631	10	60	0	36	3	71
Idaho	-------	2	-------	-------	81	-------	0	26	12	13
Illinois	33	195	143	43	128	3	13	1,503	79	23
Kansas	3	20	20	5	36	1	4	330	26	17
Louisiana	7	37	52	177	42	16	4	9	2	63
Mississippi	1	19	611	7,630	246	649	0	11	0	53
Nevada	2	-------	7	-------	3	-------	1	32	0	3
New York	48	158	-------	9	9,311	-------	8	2,143	2	39
North Dakota	1	-------	1	-------	10	-------	0	63	19	4
Oklahoma [1]	8	14	53	175	8	41	0	49	6	33
Oregon	2	2	38	1	168	-------	1	127	20	22
Rhode Island	4	6	-------	-------	103	-------	1	94	0	2
South Dakota	-------	7	1	-------	7	-------	0	93	53	1
Virginia	29	29	58	13	318	15	0	76	1	30
Washington	5	2	25	-------	846	-------	1	158	14	20

[1] Exclusive of Oklahoma City and Tulsa.

Summary of monthly reports from States—Continued

June 1936

	Cases
Actinomycosis:	
Illinois	1
Anthrax:	
Georgia	2
Mississippi	2
New York	2
Beriberi:	
California	1
Chicken pox:	
Alabama	25
California	1,390
Georgia	89
Idaho	20
Illinois	971
Kansas	76
Louisiana	2
Mississippi	168
Nevada	5
New York	1,901
North Dakota	18
Oklahoma [1]	11
Oregon	82
Rhode Island	16
South Dakota	25
Virginia	117
Washington	240
Conjunctivitis, acute:	
Georgia	2
Dengue:	
Georgia	13
Mississippi	8
Dysentery:	
Alabama (amoebic)	1
California (amoebic)	7
California (bacillary)	13
Georgia (amoebic)	19
Georgia (bacillary)	78
Illinois (amoebic)	10
Illinois (bacillary)	2
Kansas (amoebic)	3
Louisiana (amoebic)	9
Louisiana (bacillary)	2
Mississippi (amoebic)	105
Mississippi (bacillary)	2,874
New York (amoebic)	5
New York (bacillary)	28
Oklahoma [1]	38
Washington (amoebic)	1
Dysentery and diarrhea:	
Virginia	89
Enteritis (under 2 years):	
Washington	1
Epidemic encephalitis:	
Alabama	1
California	1
Illinois	7
Kansas	1
Louisiana	1
New York	11
Oklahoma [1]	2
Virginia	1
Washington	2
Food poisoning:	
California	33
Illinois	3
German measles:	
Alabama	1
California	707
Illinois	38
Kansas	11
New York	922
Rhode Island	419
Washington	217
Granuloma, coccidioidal:	
California	5
Hookworm disease:	
California	1
Georgia	184
Louisiana	5
Mississippi	350

June 1936—Continued

	Cases
Impetigo contagiosa:	
Kansas	1
Oregon	15
Lead poisoning:	
Illinois	5
Leprosy:	
California	1
Illinois	1
Mumps:	
Alabama	127
California	2,473
Georgia	137
Idaho	34
Illinois	490
Kansas	88
Louisiana	1
Mississippi	613
North Dakota	12
Oklahoma [1]	39
Oregon	36
Rhode Island	52
South Dakota	3
Virginia	112
Washington	110
Streptococcic sore throat:	
Illinois	14
Tetanus:	
Alabama	6
California	5
Georgia	2
Illinois	9
Kansas	5
Louisiana	5
New York	11
Virginia	1
Trachoma:	
California	10
Illinois	103
Mississippi	18
Oklahoma [1]	5
Rhode Island	1
Virginia	2
Washington	1
Trichinosis:	
California	3
New York	12
Tularaemia:	
Alabama	1
California	2
Georgia	3
Louisiana	5
Nevada	1
Virginia	3
Typhus fever:	
Alabama	23
California	2
Georgia	54
Mississippi	1
New York	2
Virginia	1
Undulant fever:	
Alabama	5
California	17
Georgia	3
Illinois	12
Kansas	15
Louisiana	1
Mississippi	2
Nevada	1
New York	17
North Dakota	1
Oklahoma [1]	1
Rhode Island	2
South Dakota	1
Virginia	3
Washington	2
Ophthalmia neonatorum:	
California	1
Illinois	2
Louisiana	1

June 1936—Continued

	Cases
Ophthalmia neonatorum—Continued.	
Mississippi	1
New York	7
Rhode Island	6
Virginia	1
Paratyphoid fever:	
California	5
Louisiana	3
New York	6
Virginia	2
Pink eye:	
Idaho	3
Puerperal septicemia:	
Mississippi	25
Washington	1
Rabies in animals:	
Alabama	67
California	95
Illinois	27
Louisiana	28
Mississippi	9
New York [2]	6
Oregon	4
Washington	8
Rabies in man:	
Illinois	2
Mississippi	1
Rocky Mountain spotted fever:	
California	1
Idaho	13
Illinois	1
Nevada	2
Oregon	7
South Dakota	1
Virginia	14
Scabies:	
Oklahoma [1]	9
Oregon	5
Septic sore throat:	
California	9
Georgia	37
Idaho	2
Illinois	9
Kansas	3
Louisiana	5
New York	109
Oklahoma [1]	16
Oregon	13
Rhode Island	1
South Dakota	1
Virginia	4
Washington	3
Vincent's infection:	
Illinois	27
Kansas	7
New York [2]	67
North Dakota	2
Oklahoma [1]	2
Oregon	6
Washington	1
Whooping cough:	
Alabama	53
California	1,532
Georgia	68
Idaho	10
Illinois	656
Kansas	114
Louisiana	166
Mississippi	367
Nevada	13
New York	1,048
Oklahoma [1]	5
Oregon	107
Rhode Island	11
South Dakota	7
Virginia	101
Washington	106

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 18, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	12	1	0	0	0	1	6	9
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	5
Manchester	0	------	0	0	1	0	0	1	0	0	15
Nashua	0	------	------	1	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	0	0	0	0	0	3
Burlington	0	------	0	1	0	0	0	0	0	4	8
Rutland	0	------	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	2	------	0	60	21	17	0	6	2	51	185
Fall River	0	------	0	0	1	1	0	2	0	0	29
Springfield	0	------	0	0	0	3	0	4	1	0	36
Worcester	0	------	0	28	3	3	0	1	0	8	50
Rhode Island:											
Pawtucket	0	------	0	2	0	3	0	0	0	0	------
Providence	3	------	0	5	2	5	0	0	0	2	59
Connecticut:											
Bridgeport	0	------	0	1	0	1	0	0	0	4	29
Hartford	0	------	0	1	2	1	0	1	0	0	47
New Haven	0	------	0	1	0	0	0	0	1	15	24
New York:											
Buffalo	0	------	0	36	7	10	0	9	1	6	160
New York	24	5	------	284	------	36	0	------	7	------	1,775
Rochester	1	------	0	2	6	2	0	0	0	4	125
Syracuse	0	------	0	34	4	0	0	3	0	14	76
New Jersey:											
Camden	3	------	0	2	2	2	0	0	2	0	32
Newark	0	------	0	32	2	8	0	9	2	34	130
Trenton	0	------	0	1	1	1	0	2	0	10	49
Pennsylvania:											
Philadelphia	0	1	1	32	17	21	0	28	2	63	654
Pittsburgh	3	3	2	7	20	29	0	4	1	53	193
Reading	0	------	0	5	0	0	0	1	0	5	25
Scranton	0	------	------	0	------	0	0	------	0	0	------
Ohio:											
Cincinnati	3	------	0	12	11	2	0	9	1	0	253
Cleveland	2	2	0	48	16	16	0	12	0	113	387
Columbus	0	------	0	3	2	4	0	4	0	19	124
Toledo	0	1	0	1	5	3	0	1	0	42	181
Indiana:											
Anderson	0	------	0	0	0	1	0	1	0	2	16
Fort Wayne	0	------	0	0	2	2	0	0	0	0	60
Indianapolis	3	------	0	0	22	2	0	7	0	10	243
Muncie	0	------	0	0	1	0	0	0	0	0	15
South Bend	0	------	0	0	2	3	0	0	0	0	27
Terre Haute	0	------	0	0	0	0	0	0	0	0	69
Illinois:											
Alton	0	------	0	0	0	2	1	0	0	9	18
Chicago	8	------	2	7	27	43	0	43	1	138	1,218
Elgin	0	------	0	0	3	1	0	0	0	5	22
Moline	0	------	0	0	0	0	0	1	0	0	19
Springfield	0	------	0	0	0	2	0	0	0	1	58
Michigan:											
Detroit	6	------	2	10	11	36	0	20	2	169	673
Flint	0	------	0	2	2	5	0	2	0	1	52
Grand Rapids	0	------	0	0	0	0	0	0	1	13	77
Wisconsin:											
Kenosha	0	------	0	0	1	1	3	0	0	0	14
Madison	0	------	0	0	0	1	0	0	0	6	19
Milwaukee	0	------	0	14	11	18	0	4	0	44	269
Racine	0	------	0	4	1	2	0	1	0	2	19
Superior	0	------	0	0	0	0	0	0	0	0	20
Minnesota:											
Duluth	0	------	0	1	2	1	0	0	0	9	50
Minneapolis	0	------	0	8	2	7	0	2	0	2	377
St. Paul	0	------	0	2	4	0	0	1	0	5	252

City reports for week ended July 18, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	------	------	------	0	------	0	0	------	0	3	------
Des Moines	1	------	------	0	------	0	0	------	0	0	66
Sioux City	0	------	------	0	------	3	4	------	0	0	1
Waterloo	0	------	------	0	------	2	0	------	0	0	------
Missouri:											
Kansas City	1	------	0	0	7	10	0	9	0	0	151
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	0	------	0	5	3	10	0	12	4	10	507
North Dakota:											
Fargo	0	------	0	0	0	1	0	0	0	0	21
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	2	0	0	0	0	0	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Nebraska:											
Omaha	1	------	0	0	5	1	2	1	0	0	78
Kansas:											
Lawrence	0	------	0	0	0	1	0	0	0	0	9
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	------	0	0	1	4	0	1	0	0	31
Delaware:											
Wilmington	0	------	0	0	4	0	0	1	0	0	36
Maryland:											
Baltimore	3	1	0	97	9	5	0	20	4	78	261
Cumberland	0	1	0	0	0	0	0	0	0	0	12
Frederick	0	------	0	0	1	0	0	0	0	0	5
District of Col.:											
Washington	3	------	0	32	14	3	0	6	2	37	182
Virginia:											
Lynchburg	1	------	0	0	0	1	0	0	1	2	18
Norfolk	0	------	0	0	2	1	0	1	0	1	39
Richmond	0	------	0	0	6	0	0	2	1	0	61
Roanoke	0	------	0	0	0	1	0	2	1	0	16
West Virginia:											
Charleston	0	------	0	0	1	0	0	0	0	0	11
Huntington	0	------	------	1	------	1	0	------	0	0	------
Wheeling	0	------	0	3	2	0	0	0	0	0	22
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	0	1	0	0	1	0	2	14
Wilmington	0	------	0	0	0	0	0	0	0	0	13
Winston-Salem	0	1	0	0	1	0	0	2	1	0	19
South Carolina:											
Charleston	0	2	0	0	0	0	0	1	3	0	21
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	0	0	0	0	0	0	11
Greenville	0	------	0	0	3	0	0	1	0	0	23
Georgia:											
Atlanta	1	1	0	0	6	0	0	6	2	4	85
Brunswick	0	------	0	0	0	0	0	1	0	0	1
Savannah	2	------	0	0	2	0	0	5	3	0	30
Florida:											
Miami	0	1	1	0	2	2	0	1	1	2	31
Tampa	0	1	1	0	2	1	0	2	0	1	24
Kentucky:											
Ashland	1	------	------	1	------	1	0	------	0	0	------
Covington	0	------	0	2	0	1	0	3	0	0	33
Lexington	0	------	0	0	2	0	0	2	0	0	23
Louisville	0	------	0	1	6	2	0	2	1	0	159
Tennessee:											
Knoxville	0	------	0	0	1	0	0	2	3	0	35
Memphis	3	------	0	2	8	2	0	2	5	10	113
Nashville	0	------	2	9	1	0	0	0	0	0	69
Alabama:											
Birmingham	2	------	0	0	4	1	0	8	0	5	74
Mobile	0	------	0	0	0	0	0	1	0	0	26
Montgomery	0	1	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	0	0	------
Little Rock	0	------	0	0	1	0	0	3	0	0	5
Louisiana:											
Lake Charles	0	------	0	0	2	0	0	0	0	0	5
New Orleans	6	2	1	1	9	0	0	9	1	31	142
Shreveport	1	------	0	1	1	0	0	4	4	0	32

City reports for week ended July 18, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Oklahoma City	0	------	2	0	5	1	0	8	1	0	44
Tulsa	0	------	------	0	------	0	0	------	3	0	------
Texas:											
Dallas	1	------	0	11	0	4	0	2	2	0	62
Fort Worth	0	------	0	1	1	2	0	2	1	0	51
Galveston	0	------	0	0	0	0	0	0	0	0	8
Houston	4	------	0	1	6	3	0	6	2	0	79
San Antonio	2	1	0	3	2	0	0	13	2	0	70
Montana:											
Billings	0	------	0	0	1	2	0	1	0	0	11
Great Falls	0	------	0	1	0	2	6	0	0	1	7
Helena	0	------	0	0	0	1	0	0	0	0	3
Missoula	0	------	0	0	0	0	0	0	0	0	10
Idaho:											
Boise	0	------	0	0	1	0	0	0	0	0	5
Colorado:											
Colorado Springs	0	------	0	0	0	2	0	0	0	0	12
Denver	3	------	0	7	2	2	1	4	0	31	86
Pueblo	0	------	0	1	0	2	0	0	0	0	8
New Mexico:											
Albuquerque	1	------	0	0	2	2	0	2	1	2	16
Utah:											
Salt Lake City	0	------	0	13	1	11	0	0	0	12	27
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	21	2	2	0	8	0	0	80
Spokane	0	------	0	1	4	2	0	1	1	8	32
Tacoma	0	------	0	3	1	1	0	0	0	0	37
Oregon:											
Portland	0	1	0	1	3	3	0	1	1	4	80
Salem	0	------	------	0	------	0	0	------	0	5	------
California:											
Los Angeles	2	4	1	143	9	10	0	14	0	87	288
Sacramento	1	------	0	0	8	6	0	2	0	39	29
San Francisco	1	------	0	24	4	18	0	6	0	9	170

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	3
Massachusetts:			
Boston	2	2	1
Connecticut:			
Bridgeport	0	0	1
New York:			
New York	1	------	4
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	1	0	1
Pittsburgh	1	0	0
Ohio:			
Cincinnati	2	1	0
Cleveland	2	0	0
Indiana:			
Indianapolis	1	0	0
Illinois:			
Alton	0	1	0
Chicago	5	2	0
Springfield	1	0	0
Michigan:			
Detroit	1	0	2
Missouri:			
Kansas City	1	0	0
Kansas:			
Wichita	0	0	2
Maryland:			
Baltimore	1	0	0
District of Columbia:			
Washington	3	2	0
North Carolina:			
Wilmington	0	1	0
South Carolina:			
Greenville	0	0	1
Georgia:			
Atlanta	1	0	0
Florida:			
Tampa	1	1	0
Kentucky:			
Louisville	2	0	0
Tennessee:			
Knoxville	0	1	0
Alabama:			
Birmingham	0	0	4
Oklahoma:			
Oklahoma City	1	0	0
Washington:			
Spokane	0	0	2
California:			
Los Angeles	3	2	3

Epidemic encephalitis.—Cases: Philadelphia, 1; Baltimore, 1.
Pellagra.—Cases: Philadelphia, 1; Winston-Salem, 1; Miami, 1.
Typhus fever.—Cases: Norfolk, 1; Savannah, 5; Fort Worth, Tex., 1; Houston, 1. Deaths: Savannah, 1

FOREIGN AND INSULAR

CANADA

Manitoba—Bois Sevain—Poliomyelitis.—According to information dated July 25, 1936, 11 cases of poliomyelitis with 3 deaths had occurred at Bois Sevain, near the International Peace Garden, Manitoba, Canada, since June 20, 1936.

Provinces—Communicable diseases—2 weeks ended July 11, 1936.—During the 2 weeks ended July 11, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis						1				1
Chicken pox		2	1	123	261	83	68	16	93	647
Diphtheria		3	1	38	8	9	5		1	65
Dysentery					1					1
Erysipelas				8	6	2		3	6	25
Influenza		1			1	7			8	17
Lethargic encephalitis						2				2
Measles		30	3	152	837	222	73	102	75	1,494
Mumps		5			284	11	30	29	45	401
Paratyphoid fever					2					2
Pneumonia	4				14		3		16	37
Poliomyelitis					3	4				7
Scarlet fever		18	4	101	269	73	12	81	24	577
Trachoma									3	3
Tuberculosis	3	15	31	125	92	20	14	2	38	340
Typhoid fever			7	37	4	2	1	4	3	58
Undulant fever				1	2	1	1			5
Whooping cough		2	4	85	128	6	26	10	30	291

CUBA

Habana—Communicable diseases—Fiscal year ended June 30, 1936.—During the fiscal year July 1, 1935, to June 30, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	July to December, 1935		January to June, 1936		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	4	2	1		5	2
Diphtheria	57	9	104	2	161	11
Leprosy	3		2		5	
Malaria	[1] 739	12	[1] 228	3	[1] 967	15
Measles	4				4	
Poliomyelitis	[1] 2		[1] 34		[1] 36	
Scarlet fever	5		4		9	
Tuberculosis (all forms)	254	55	221	16	475	71
Typhoid fever	[1] 364	39	[1] 274	4	[1] 638	43

[1] Includes imported cases.

Provinces—Notifiable diseases—Fiscal year ended June 30, 1936.—During the fiscal year July 1, 1935, to June 30, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	12	14	7	63	29	14	139
Cerebrospinal meningitis	1			1			2
Chicken pox	1	163	16	62	9	89	340
Diphtheria	3	22	14	30	18	20	107
Hookworm disease	2		2	12		143	159
Leprosy		18	1	9	18	64	110
Malaria	3,442	994	1,037	4,962	5,299	10,449	26,183
Measles	42	17	31	54	53	20	217
Poliomyelitis	5	6	4	43	8	36	102
Scarlet fever	1	1		1	1	2	6
Tetanus, infantile				1			1
Tuberculosis	100	263	213	428	248	415	1,667
Typhoid fever	79	645	170	425	426	491	2,236

CZECHOSLOVAKIA

Communicable diseases—April 1936.—During the month of April 1936, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2		Paratyphoid fever	12	1
Cerebrospinal meningitis	24	8	Poliomyelitis	11	5
Chicken pox	216		Puerperal fever	39	19
Diphtheria	1,764	138	Scarlet fever	2,210	85
Dysentery	1		Trachoma	98	
Influenza	287	15	Typhoid fever	252	24
Lethargic encephalitis	1	1	Typhus fever	99	4
Malaria	252				

JAMAICA

Communicable diseases—4 weeks ended July 11, 1936.—During the 4 weeks ended July 11, 1936, certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	1	9	Puerperal fever		2
Dysentery	22	8	Scarlet fever	1	
Erysipelas		1	Tuberculosis	44	81
Leprosy	1	6	Typhoid fever	22	72

VIRGIN ISLANDS

Notifiable diseases—April–June 1936.—During the months of April, May, and June 1936, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	April	May	June	Disease	April	May	June
Chicken pox	2	1	1	Pellagra	2	1	1
Dengue	1		4	Sprue	1		
Dysentery			1	Syphilis	5	5	17
Filariasis	1	3	2	Tetanus	1		
Gonorrhea	5	10	10	Tuberculosis	4	2	2
Influenza	2			Typhoid fever	1		
Leprosy		1		Uncinariasis	5	4	1
Malaria	9	2					

YUGOSLAVIA

Communicable diseases—June 1936.—During the month of June 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	62	4	Paratyphoid fever	12	2
Cerebrospinal meningitis	7	4	Scarlet fever	351	7
Diphtheria and croup	489	34	Sepsis	6	1
Dysentery	54	4	Tetanus	58	30
Erysipelas	217	10	Typhoid fever	232	27
Influenza	12		Typhus fever	78	6
Measles	917	4			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for July 31, 1936, pages 1053–1067. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued August 28, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Brazil—Sao Paulo.—According to information dated July 29, 1936, 23 cases of pneumonic plague with 18 deaths had been reported at Sao Paulo, Brazil. All sanitary measures had been taken.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—Two rats found, 1 on July 13, 1936, and 1 on July 15, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

Smallpox

Finland—Province of Uleaborg.—On July 21, 1936, 19 cases of smallpox were reported in the Province of Uleaborg, Finland.

Typhus Fever

Irish Free State—Galway County.—During the week ended July 11, 1936, 1 case of typhus fever was reported at Bothar Buidhe, Carraroe, and 1 case at Oughterard, both in Galway County, Irish Free State.

Netherlands—Rotterdam.—During the week ended May 16, 1936, 1 case of typhus fever was reported at Rotterdam, Netherlands. The patient was taken from a vessel from Algiers, though the vessel did not enter the port.

Yellow Fever

Brazil—Matto Grosso State—Tres Lagoas.—On June 16, 1936, 1 death from yellow fever was reported at Tres Lagoas, Matto Grosso State, Brazil.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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PREVENTION OF INTRANASALLY INOCULATED ENCEPHALITIS (ST. LOUIS TYPE) IN MICE AND OF POLIOMYELITIS IN MONKEYS BY MEANS OF CHEMICALS INSTILLED INTO THE NOSTRILS

By CHARLES ARMSTRONG and W. T HARRISON, *Surgeons, United States Public Health Service, National Institute of Health*

Encouraging results in the prevention of intranasally inoculated encephalitis (St. Louis type) in mice by means of chemicals instilled into the nostrils have been reported by Armstrong (*1*), and Armstrong and Harrison (*2*, *3*). Successful results were similarly produced against intranasally inoculated poliomyelitis in monkeys by Armstrong and Harrison (*2*, *3*); Schultz and Gebhardt (*4*); and Sabin, Olitsky, and Cox (*5*).

Among chemicals found effective in preventing intranasal infection with the above-mentioned neurotropic viruses were several astringents, such as sodium aluminum sulphate (*1*, *2*, *3*, *5*), picric acid (*3*, *4*), and tannic acid (*5*).

We desire to report here certain findings which apparently exert a marked influence upon the effectiveness of picric acid solutions in preventing experimental intranasal infection by the above-mentioned viruses. Unpublished work by Armstrong indicates that the protection afforded mice against intranasal infection with encephalitis virus is not due, at least not in major part, to its antiseptic action, since, mixed with saline, buffered to pH 7.6, it exerted no marked viricidal effect. Sabin, Olitsky, and Cox (*5*) believe that the protection afforded by sodium alum is likewise not due to its viricidal action.

The local effects produced by astringents are usually attributed in large part to their ability to form precipitates with proteins; and since the acidity of the mixture is known to be an important factor in this reaction, it was deemed desirable to study this relationship *in vitro* and to attempt to correlate the findings with the protection obtained in animals.

METHODS

Solutions of picric acid in varying buffers (pH 8.6 to pH 1.4) were prepared by adding 1 part of a warm 2 percent picric acid in saline solution to 3 parts of the appropriate buffer, thus giving a 0.5 percent solution of picric acid.

The coagulating effect of the various buffered solutions was tested by placing 0.2 cc of the solution in small test tubes to which human

ascitic fluid or pooled human serum was slowly added with constant agitation. The appearance or nonappearance of a floccular precipitate was noted. The precipitate, if formed, was found to redissolve in excess of the protein-containing fluid. The amount of such fluid necessary to bring about resolution of the precipitate was recorded in each instance.

The results as shown in table 1 relate to human ascitic fluid, each recorded observation being the average of several trials. Results with blood serum were similar to those given for ascitic fluid, with the exception that it was necessary to add somewhat less serum than ascitic fluid to bring about resolution of any coagulum which formed.

The final hydrogen ion concentrations of the buffered picric acid solutions were determined by Senior Biophysicist Herbert Kahler by means of the glass electrode method.

TABLE 1.—*In vitro studies of the protein-coagulating action of various chemical solutions*

Chemical	Amount of chemical in test	Ascitic fluid added to produce flocculation	Ascitic fluid added to produce resolution of flocculi	Amount of N/10 NaOH to render 1 cc chemical alkaline to litmus	Electrically determined pH of solution
	Cc.	*Cc.*	*Cc.*	*Cc.*	
0.5 percent picric acid-buffered pH 8.6	0.2	0.01	0.08	0.17	[1] 1.90
0.5 percent picric acid-buffered pH 8.0	.2	(2)	(2)	.13	6.45
0.5 percent picric acid-buffered pH 7.0	.2	(2)	(2)	.28	5.42
0.5 percent picric acid-buffered pH 5.0	.2	.01	.18	.49	3.20
0.5 percent picric acid-buffered pH 4.4	.2	.01	.25	.63	2.93
0.5 percent picric acid-buffered pH 2.8	.2	.01	.45	.86	2.05
0.5 percent picric acid-buffered pH 1.4	.2	.01	.31	.80	1.30
0.5 percent picric acid in 0.85 percent saline	.2	.01	.14	.26	1.66
0.5 percent picric acid +0.5 percent sodium aluminum in 0.85 percent saline	.2	.01	.63	.77	1.90
0.5 percent sodium aluminum in 0.85 percent saline	.2	.04	.54	.50	3.62

[1] This H_3BO_3 KCl NaOH buffer was thrown out of its buffer range by the addition of picric acid.
[2] No flocculation.

Buffers alone occasioned no flocculation when mixed with ascitic fluid in the same proportions.

In vitro results.—It was found that the picric acid solutions in pH 8.0 and pH 7.0 buffers, which by the electrical method showed readings of pH 6.45 and pH 5.42, respectively, gave no precipitation when ascitic fluid or serum was added in any proportion, whereas in more acid ranges precipitation promptly occurred. The precipitates formed at the more acid ranges tended to be more copious and more difficult to redissolve than were those formed at a lower acidity. The buffer solutions alone occasioned no protein precipitation.

In vivo results.—Should the protective action of picric acid in animals be dependent upon its local protein coagulating effect, a difference should be apparent in mice and monkeys prepared with the buffered pH 7.0 solution, which occasioned no precipitation with proteins, as compared with those which received the more acid strongly flocculating solutions.

TABLE 2.—*Protection of mice against intranasally inoculated encephalitis virus (St. Louis type) by means of various chemical solutions previously instilled into their nostrils*

Solution intranasally instilled	Number of mice treated intranasally on specified date				Number of mice given 0.03 cc 1:430 dilution of virus intranasally, 6/12/36	Deaths by days following intranasal inoculations of virus														Number of mice survived	Percent of mice survived
	6/1/36	6/3/36	6/5/36	6/8/36		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
0.5 percent picric acid in pH 8.6 buffer	35	35	35	35	35							1	[1] 1	1	1					31	91
0.5 percent picric acid in pH 7.0 buffer	35	35	35	35	34						8	11	4	1	1					9	26
0.5 percent picric acid in pH 5.0 buffer	35	35	35	35	35						1	1	1		1					31	89
0.5 percent picric acid in pH 2.8 buffer	35	35	35	35	35	[2] 1						1		1				1		31	91
0.5 percent picric acid in pH 1.4 buffer	35	35	35	35	34							1			2					31	91
0.5 percent picric acid in 0.85 percent saline	35	33	33	33	32			[2] 1												31	100
Nonprepared controls	35	35	35	35	35						6	17	1		2		1			8	23

[1] Killed by cage door.
[2] Excluded from compilations as deaths were too early for encephalitis.

TABLE 3.—*Protection of mice against intranasally inoculated encephalitis virus (St. Louis type) by means of various chemical solutions previously instilled into their nostrils*

Solution intranasally instilled	Number of mice treated intranasally on specified date			Number of mice given 0.03 cc 1:430 dilution of virus intranasally, 7/1/36	Deaths by days following intranasal inoculation of virus														Number of mice survived	Percent of mice survived
	6/24/36	6/26/36	6/29/36		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
0.5 percent picric acid in pH 8.6 buffer	35	35	35	35	--	--	--	--	--	1	6	--	--	--	--	--	--	--	28	80
pH 8.6 buffer	35	35	34	33	--	--	--	--	--	--	12	5	1	1	--	--	--	--	14	42
0.5 percent picric acid in pH 7.0 buffer	35	35	35	35	--	--	--	--	--	3	12	7	1	1	--	--	--	--	11	31
pH 7.0 buffer	35	35	35	35	--	--	--	--	1	--	13	6	--	--	--	--	--	--	15	43
0.5 percent picric acid in pH 4.4 buffer	35	35	34	34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34	100
pH 4.4 buffer	35	35	35	33	--	--	--	--	--	1	17	4	2	--	--	--	--	--	9	27
0.5 percent picric acid in pH 2.8 buffer	35	35	35	35	--	--	--	--	--	--	--	1	--	--	--	--	1	--	33	94
pH 2.8 buffer	35	35	35	35	--	--	--	--	--	--	6	1	--	--	--	--	--	--	28	80
0.5 percent picric acid in pH 1.4 buffer	36	36	36	36	--	--	--	--	--	--	3	1	--	--	--	--	--	--	32	89
pH 1.4 buffer	35	35	35	35	--	--	--	--	--	--	1	--	2	3	2	--	--	2	25	71
0.5 percent picric acid in 0.85 percent saline	35	35	34	34	--	--	--	--	--	--	3	--	--	--	--	--	--	--	31	91
Nonprepared controls	35	35	35	34	--	--	--	--	--	1	11	3	3	--	--	1	--	--	15	44

By reference to tables 2 and 4 it may be noted that the picric acid solution made with pH 7.0 buffer afforded slight, if any, protection, 26 percent of mice surviving, as compared with 23 percent for the controls, whereas with solutions buffered at a more acid level, from 89 to 100 percent of the mice survived. Similar results were found in monkeys.

TABLE 4.—*Preventive effect of chemicals in monkeys*

Experiment	Monkey no.	Solution and date of intranasal injection (1.5 cc. each nostril)		Dates virus administered (1 cc. supernatant each nostril)	First day of fever	Day of death	Remarks
A		0.32 percent picric acid in 2-percent sodium aluminum.	(1935) Aug. 28, 30. Sept. 6, 10, 12, 14.	(1935) Sept. 18, 19, 20.			
	1005				—	S	No symptoms
	1006				—	S	Do.
	1007				—	S	Do.
	1008				—	S	Do.
		Controls. No chemicals intranasally.		Sept. 18, 19, 20.			
	996				5	9	Poliomyelitis.
	997				5	9	Do.
	998				6	10	Do.
	999				6	10	Do.
B		0.16 percent picric acid in 0.5-percent sodium aluminum.	Oct. 29, 31. Nov. 2, 4, 6, 8.	Nov. 12, 13, 14.			
	76				—	S	No symptoms.
	77				—	S	Do.
	78				—	S	Do.
	79				—	S	Do.
		Controls. No chemicals intranasally.		Nov. 12, 13, 14.			
	88				4	7	Poliomyelitis.
	89				—	S	No symptoms.
	90				3	7	Poliomyelitis.
	91				3	10	Do.

S=survived.

TABLE 4.—*Preventive effect of chemicals in monkeys*—Continued

Experiment	Monkey no.	Solution and date of intranasal injection (1.5 cc. each nostril)		Dates virus administered (1 cc. supernatant each nostril)	First day of fever	Day of death	Remarks
C		0.33 percent picric acid in 0.5-percent sodium aluminum.	(1936) Apr. 20. May 6, 13, 20, 29. June 3.	(1936) May 29 (a. m. and p. m.).			
	180				—	S	No symptoms.
	182				—	S	Do.
	184				—	S	Do.
	186			May 31 (a. m. and p. m.).	—	S	Do.
	188				—	S	Do.
	190				—	S	Do.
	197			June 2 (a. m. and p. m.).	—	S	Do.
	199				—	S	Do.
	201				—	S	Do.
		Controls. No chemicals intranasally.		May 29 (a. m. and p. m.).			
	192				3	7	Poliomyelitis.
	194				—	S	No symptoms.
	196				5	7	Poliomyelitis.
	198			May 31 (a. m. and p. m.).	—	S	No symptoms.
	200				4	8	Poliomyelitis.
	202				—	S	No symptoms.
	203			June 2 (a. m. and p. m.).	4	9	Poliomyelitis.
	204				4	8	Do.
	205				3	8	Do.
D		0.5 percent picric acid in 0.5-percent alum.	June 25, 27, 29. July 3, 10.	July 16 (a. m. and p. m.).			
	217				—	S	No symptoms.
	218				—	S	Do.
	219				—	S	Do.
		Controls. No chemicals intranasally.		July 16 (a. m. and p. m.).			
	220				4	8	Poliomeylitis.
	221				4	8	Do.
	222				3	8	Do.
		0.5-percent picric acid in pH 2.8 buffer.	June 25, 27, 29. July 3, 10.	July 16 (a. m. and p. m.).			
	214				—	S	No symptoms.
	215				—	S	Do.
	216				—	S	Do.
		0.5-percent picric acid in pH 7.0 buffer.	June 25, 27, 29. July 3, 10.	July 16 (a. m. and p. m.).			
	211				5	10	Poliomyelitis.
	212				5	9	Do.
	213				5	10	Do.

S=survived.

The increased protective action shown by more acid solutions of picric acid may, however, be due to their increased ability to coagulate proteins, to their increase in acidity itself, to the chemicals in the buffer, or to some combination of two or more of these factors. In the hope of elucidating this question, groups of mice were prepared by instilling into their nostrils 0.5 percent picric acid dissolved in buffer solutions ranging from pH 8.6 to pH 1.4, while similar control groups received nasal instillations of the various buffer solutions (3 parts diluted with saline 1 part) to which no picric acid had been added. By reference to table 3 it may be noted that the picric acid in acid buffers showed an increased protection over that shown by the corresponding buffer alone. This increased protection is especially marked with the pH 4.4 solutions, but less so for pH 2.8 and pH 1.4 mixtures. By reference to table 1 it may be noted that picric acid in solution tends to increase acidity, so that the identical solution without picric acid is no longer an adequate control for determining the effect of picric acid alone. In the case of buffers of pH 4.4 plus 0.5 percent picric acid, which protected 100 percent of the mice, it may be noted that the actual pH value was 2.93, or but slightly less acid than buffer pH 2.80, which protected 80 percent of the mice. If acidity were the sole important factor, the pH 2.80 buffer alone should have protected somewhat better. Again, the acidifying effect of picric acid is less apparent in more acid buffers. For instance, by adding 0.5 percent of picric acid to pH 1.4 buffer, its pH was reduced to only 1.3. Here again, however, the picric acid solution is more effective as a preventive than the buffer alone.

The buffers from pH 8.6 to 1.4 were made according to Clark (*6*) and, as noted in his text, the chemicals employed vary for different pH ranges both as to kinds and proportions. This leads one to feel that the pH values and not the chemicals *per se* are the important factors.

The series studied, however, is too meager to determine accurately the significance of the possible factors involved, but does indicate that buffer solutions of less acidity than pH 4.4 have of themselves little or no protective effect in mice, while at pH 2.80 and 1.40 the protection is considerable but scarcely sufficient to account for the full effect afforded by buffers plus picric acid. The prophylaxis afforded by picric acid solutions is, therefore, possibly, in part at least, dependent upon its protein-coagulating properties in acid mixtures.

If this assumption be true, acid solutions giving a prompt and copious flocculation of proteins should be the most effective preventives. By reference to table 1 it may be noted that, upon this assumption, 0.5 percent picric acid combined with 0.5 percent sodium aluminum sulphate in saline, or 0.5 percent picric acid in pH 4.4 to more acid buffers should be effective mixtures.

The picric-alum mixture, for instance, showing a pH value of 1.90, caused prompt coagulation with ascitic fluid, and the clot at its maximum was so firm that the tube could be inverted without spilling. Moreover, the coagulum was relatively difficult of resolution, a consideration with a possible bearing on the duration of protection.

Actual trials have shown that the picric-alum combinations are quite effective in protecting monkeys against intranasal infection with poliomyelitis virus, as was also 0.5 percent picric acid in pH 2.8 buffer. By reference to table 4 it may be noted that all of 20 monkeys prepared with the picric-alum mixtures and 3 prepared with 0.5 percent picric acid in pH 2.8 buffer survived without symptoms, while of 20 unprepared controls and 3 treated with the ineffective pH 7.0–0.5 percent picric acid, all died except 4.

Tests are now under way to determine the duration of protection afforded monkeys by these two preparations. The solution of 0.5 percent picric acid in 0.5 percent sodium aluminum sulphate was the one selected for trial as a control measure against poliomyelitis in certain southern States. The methods of preparation and directions for use of the solution are given at the end of this article.

SUMMARY

1. Solutions of picric acid buffered at a pH range which gave no coagulation of protein when mixed with ascitic fluid or serum afforded no protection when introduced repeatedly into the nostrils of mice and monkeys prior to intranasal inoculation with encephalitis or poliomyelitis virus, respectively.

2. Solutions of picric acid buffered in an acid range which permitted coagulation of protein afforded protection to both mice and monkeys.

3. Buffer solutions with an acidity of pH 2.80, or greater, of themselves exert a protective influence but to a less degree than is apparent by 0.5 percent picric acid solutions of approximately the same acidity.

4. Mixtures of picric acid with sodium aluminum sulphate in saline protected all of 20 monkeys against an infection which occassioned poliomyelitis in 16 of 20 nonprepared controls.

5. Solutions of 0.5 percent picric acid in pH 4.4 and more acid buffers were also very effective in mice and in a small group of monkeys.

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PICRIC ACID-SODIUM ALUM NASAL SPRAY FOR EXPERIMENTAL POLIOMYELITIS CONTROL

FORMULA

Solution A.—Dissolve 1 gram of sodium alum (sodium aluminum sulphate C. P.) in 100 cc of physiological salt solution (0 85 percent). Turbidity may be removed by filtering one or more times through the same filter paper or Berkefeld filter.

Solution B.—Dissolve 1 gram of picric acid (C. P.) in 100 cc of physiological salt solution (0 85 percent). (Warming will facilitate solution.)

Mix equal amounts of solutions A and B. This gives a 0.5-percent solution of each ingredient, which is stable, and it is this mixture which is to be dispensed.

On the appearance of cases of poliomyelitis in the community, spray the nose thoroughly once daily on alternate days for 3 or 4 applications, then once weekly thereafter for the duration of the poliomyelitis season. The spray should be directed upward toward the top of the head.

NO SUBSTITUTES SHOULD BE USED

REPORT ON MARKET-MILK SUPPLIES OF URBAN COMMUNITIES

Compliance of the Market-Milk Supplies of Urban Communities with the Grade A Pasteurized and Grade A Raw Milk Requirements of the Public Health Service Milk Ordinance and Code (as Shown by Ratings of 90 Percent or More Reported by the State Milk-Sanitation Authorities During the Period July 1, 1934, to June 30, 1936)

The accompanying list gives the sixth semiannual revision of the list of urban communities in which the pasteurized market milk is both produced and pasteurized in accordance with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code, and in which the raw market milk sold to the final consumer is produced in accordance with the Grade A raw milk requirements of said ordinance and code, as shown by ratings of 90 percent or more reported by State milk-sanitation authorities.

The primary reason for publishing such lists from time to time is to encourage the communities of the United States to attain and maintain a high level of excellence in the public-health control of milk supplies.

It is emphasized that the Public Health Service does not intend to imply that all communities not on the list are not provided with high-grade milk supplies. Some communities which have high-grade milk supplies are not included because arrangements have not been made for the determination of their ratings by the State milk-sanitation authority. In other cases, the ratings which have been determined are now more than 2 years old and have therefore lapsed.

The rules under which a community is included in this list are as follows:

(1) All ratings must have been determined by the State milk-sanitation authority in accordance with the Public Health Service

rating method, based upon the Grade A pasteurized milk and the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code.

(2) No community will be included in the list unless both its pasteurized milk and its raw milk ratings are 90 percent or more; provided that communities in which only raw milk is sold will be included if the raw milk ratings are 90 percent or more.

(3) The rating used will be the latest rating submitted to the Public Health Service, but no rating will be used which is more than 2 years old.

(4) Occasional surprise checks will be made of the rating methods used by the State, and discounts will be applied if State ratings are found to be more than 5 percent too high.

Communities are urgently advised to bring their ordinances up to date at least every 5 years, since ratings will be made on the basis of later editions if those adopted locally are more than 5 years old.

Communities which are not now on the list should request the State milk-sanitation authority to determine their ratings and, if necessary, improve their status sufficiently to merit inclusion in the list.

Communities which are now on the list should not permit their ratings to lapse, as ratings more than 2 years old cannot be used.

Communities which have not yet adopted the Public Health Service Milk Ordinance should give thoughtful consideration to the advisability of doing so. It is obviously easier to satisfy the requirements upon which the rating method is based if these are included in the local legislation.

Communities which are enforcing the Public Health Service Milk Ordinance, but which have not yet been admitted to the list, should determine whether this has been the result of failure to enforce the ordinance strictly or failure to bring the ordinance up to date.

State milk-sanitation authorities which are not now equipped to determine municipal ratings are urged, in fairness to their communities, to equip themselves as soon as possible. The personnel required is small, as in most States one milk specialist is sufficient for the work.

The inclusion of a community in this list means that the pasteurized milk sold in the community, if any, is of such a degree of excellence that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A pasteurized milk is 90 percent or more, and that, similarly, the raw milk sold in the community, if any, so nearly meets the requirements that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A raw milk is 90 percent or more. However, high grade pasteurized milk is safer than high grade raw milk, because of the added protection of pasteurization. To secure this added protection, those who are dependent on raw milk can pasteurize

the milk at home in the following simple manner: Place the milk in an aluminum vessel on a hot flame and heat to 155° F., stirring constantly; then immediately set the vessel in cold water and continue stirring until cool.

TABLE 1.—*Communities in which all market milk is pasteurized. In these communities market milk complies with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized milk ratings of 90 percent or more*

Community	Percentage of milk pasteurized	Date of rating
MINNESOTA		
Winona	100	Sept. 14, 1934
NORTH CAROLINA		
Princeville	100	Apr. 18, 1935
Tarboro	100	Do.

TABLE 2.—*Communities in which some market milk is pasteurized. In these communities the pasteurized market milk complies with the Grade A pasteurized milk requirements and the raw market milk complies with the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized and raw-milk ratings, respectively, of 90 percent or more*

[NOTE.—All milk should be pasteurized or boiled before it is consumed, either commercially or at home. See text for home method.]

Community	Percentage of milk pasteurized	Date of rating	Community	Percentage of milk pasteurized	Date of rating
ALABAMA			MISSISSIPPI		
Tuscaloosa	77	Dec. 13, 1935.	Greenville	26	Aug. 29, 1935.
			McComb	8	Jan. 9, 1936.
ARIZONA			Vicksburg	41	June 20, 1935.
Flagstaff	32	February 1935.	MISSOURI		
Tucson	85	June 21, 1935.	Columbia	41	Mar. 3, 1936.
Yuma	39	June 14, 1935.	Hannibal	31	May 29, 1936.
			Jefferson City	49	Nov. 22, 1935.
ARKANSAS			Moberly	49	May 1, 1936.
			St. Joseph	31	Aug. 9, 1935.
Little Rock	19	Dec. 15, 1935.	Sedalia	20	Apr. 10, 1936.
Pine Bluff	32	June 1936.			
Texarkana	18	Feb. 20, 1936.	NEW MEXICO		
KANSAS			Las Cruces	53	Nov. 13, 1935.
			NORTH CAROLINA		
Junction City	31	June 1936			
Lawrence	48	May 1936.	Charlotte	19	Dec. 15, 1934.
Topeka	59	Do.	Durham	83	Dec. 14, 1934.
Wichita	58	December 1935.	Fayetteville	50	Mar. 28, 1935.
			Greensboro	62	Nov. 24, 1934.
KENTUCKY			Kinston	16	Apr. 10, 1936.
			Morehead City	58	Dec. 14, 1935.
Ashland	86	June 1936.	Rocky Mount	20	Sept. 12, 1934.
Bowling Green	37	May 1936.	Winston-Salem	46	Nov. 11, 1934.
Glasgow	62	Do.	OKLAHOMA		
Henderson	34	Do.			
Louisville	96	March 1936.	Bartlesville	32	Mar. 20, 1936.
			Blackwell	48	June 3, 1936.
MINNESOTA			Muskogee	59	January 1936.
			Oklahoma City	70	December 1935.
Little Falls	55	Oct. 23, 1935.	Tulsa	73	January 1936.

TABLE 2.—*Communities in which some market milk is pasteurized. In these communities the pasteurized market milk complies with the Grade A pasteurized milk requirements and the raw market milk complies with the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized and raw-milk ratings, respectively, of 90 percent or more*—Continued

Community	Percentage of milk pasteurized	Date of rating	Community	Percentage of milk pasteurized	Date of rating
OREGON			TEXAS—continued		
Portland	76	October 1934.	Kerrville	72	May 8, 1936.
TENNESSEE			Laredo	39	December 1935.
			Livingston	20	March 1936.
			Lubbock	32	July 10, 1935.
Bristol	48	May 8, 1935.	Midland	31	May 6, 1936.
Clarksville	42	Apr. 26, 1935.	Port Arthur	38	June 1936.
Memphis	80	May 29, 1935.	San Angelo	58	Apr. 8, 1936.
Union City	32	Sept. 28, 1934.	San Antonio	64	September 1935.
TEXAS			Seguin	5	March 1936.
			Sherman	21	Dec. 21, 1934.
			Sweetwater	56	June 23, 1936.
Abilene	70	Aug. 7, 1935.	Texarkana	20	May 1935.
Amarillo	61	June 29, 1935.	Tyler	60	January 1936.
Austin	35	Dec. 19, 1935.	Victoria	13	February 1936.
Ballinger	50	Mar. 2, 1936.	Waco	31	Sept. 20, 1935.
Beaumont	57	June 1936.	Wichita Falls	70	May 26, 1936.
Big Spring	27	Aug. 5, 1935.			
Brownwood	17	June 26, 1936.	VIRGINIA		
Corsicana	4	Mar. 26, 1935.			
Dallas	73	Dec. 7, 1935.	Bristol	48	May 8, 1935.
Denton	64	Mar. 4, 1936.			
El Paso	71	July 31, 1935.	WASHINGTON		
Fort Worth	83	Feb. 23, 1935.			
Gainesville	46	Sept. 6, 1935.	Camas	10	September 1934.
Houston	83	October 1935.	Vancouver	24	Do.

TABLE 3.—*Communities in which no market milk is pasteurized, but in which the raw market milk complies with the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by raw-milk ratings of 90 percent or more*

[NOTE.—All milk should be pasteurized or boiled before it is consumed, either commercially or at home. See text for home method]

Community	Date of rating	Community	Date of rating
ALABAMA		MISSOURI	
Demopolis	Nov. 22, 1935.	Ash Grove	Aug. 16, 1935.
Scottsboro	Dec. 31, 1935.		
Stevenson	Do.	NEW MEXICO	
Sylacauga	Dec. 6, 1935.	Clayton	June 20, 1935.
Talladega	Do.	Deming	Mar. 26, 1935.
York	Nov. 20, 1935.		
KANSAS		NORTH CAROLINA	
Horton	Dec. 4, 1934.	Angier	May 18, 1936.
Sabetha	Sept. 27, 1935.	Cary	Apr. 23, 1936.
		Coats	May 18, 1936.
KENTUCKY		Dunn	Do.
		Elkin	Sept. 12, 1934.
Leitchfield	June 1935.	Erwin	May 18, 1936.
		Fairmont	May 28, 1936.
MISSISSIPPI		Hamlet	Aug. 28, 1934.
		Hertford	June 25, 1936.
Brookhaven	May 17, 1935.	Hope Mills	Sept. 6, 1934.
Durant	May 13, 1935.	Lumberton	May 28, 1936.
Lexington	Do.	Monroe	Oct. 24, 1934.
Magnolia	Jan. 10, 1936.	Mount Airy	Sept. 12, 1934.
Ocean Springs	Sept. 5, 1935.	New Bern	Dec. 12, 1935.
Pascagoula	Do.	Pinehurst	Dec. 15, 1934.
Picayune	June 5, 1935.	Raeford	May 29, 1936.
Yazoo City	May 14, 1935.	Red Springs	May 28, 1936.

Table 3.—*Communities in which no market milk is pasteurized, but in which the raw market milk complies with the Grade A raw-milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by raw-milk ratings of 90 percent or more*—Continued

Community	Date of rating	Community	Date of rating
NORTH CAROLINA—continued		TEXAS	
Roanoke Rapids	Apr. 6, 1936.	Brenham	June 11, 1936
Rockingham	Aug. 29, 1934.	Bryan	May 1936.
Southern Pines	Aug. 31, 1934.	Canyon	Apr 13, 1936.
Southport	Oct. 2, 1935.	Childress	Apr. 17, 1936.
Statesville	Mar. 27, 1935.	Colorado	July 19, 1935.
Sylva	Sept. 23, 1935.	Commerce	Apr. 24, 1936.
Washington	Sept. 26, 1935.	Crockett	May 1936.
Williamston	June 25, 1936.	Del Rio	June 12, 1936.
Windsor	Apr. 8, 1936.	Jacksonville	January 1936
TENNESSEE			
Alcoa	July 3, 1935.		
Dyersburg	October 1934.		

EXTENT OF RURAL HEALTH SERVICE IN THE UNITED STATES, DECEMBER 31, 1931, TO DECEMBER 31, 1935

During the year 1935 data concerning the extent of rural health service were again obtained by the United States Public Health Service from State departments of health. This information has been compiled in table 1, wherein are shown, by States, the counties, townships, or districts in which the rural sections thereof were provided with health service under the administration of whole-time local health officers. The data are presented, as of December 31, for the years 1931 to 1935, inclusive.

In the list for the year ended December 31, 1935, there are included all counties, townships, or districts which were operated in units directed by whole-time local health officers and maintained by the pooling of local appropriations from official sources. Counties, townships, or districts with whole-time health organizations maintained entirely by State departments of health are also included in table 1.

Table 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*

ALABAMA

1931	1932	1933	1934	1935
Baldwin	Baldwin	Barbour	Autauga	Autauga
Barbour	Barbour	Blount	Barbour	Baldwin
Blount	Blount	Bullock	Blount	Barbour
Bullock	Bullock	Calhoun	Bullock	Blount
Calhoun	Calhoun	Chambers	Calhoun	Bullock
Chambers	Chambers	Cherokee	Chambers	Calhoun
Cherokee	Cherokee	Cleburne	Cherokee	Chambers
Choctaw	Choctaw	Conecuh	Cleburne	Cherokee
Clarke	Clarke	Covington	Colbert	Chilton
Cleburne	Cleburne	Crenshaw	Conecuh	Cleburne
Coffee	Coffee	Cullman	Covington	Coffee
Colbert	Colbert	Dale	Crenshaw	Colbert
Conecuh	Conecuh	Dallas	Cullman	Conecuh
Covington	Covington	De Kalb	Dale	Coosa
Crenshaw	Crenshaw	Elmore	Dallas	Covington

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

1931	1932	1933	1934	1935
Cullman	Cullman	Escambia	Elmore	Crenshaw
Dale	Dale	Etowah	Escambia	Cullman
Dallas	Dallas	Franklin	Etowah	Dale
De Kalb	De Kalb	Geneva	Franklin	Dallas
Elmore	Elmore	Houston	Houston	De Kalb
Escambia	Escambia	Jackson	Jackson	Elmore
Etowah	Etowah	Jefferson	Jefferson	Escambia
Franklin	Franklin	Lauderdale	Lamar	Etowah
Geneva	Geneva	Lawrence	Lauderdale	Franklin
Houston	Houston	Lee	Lawrence	Houston
Jackson	Jackson	Limestone	Lee	Jackson
Jefferson	Jefferson	Macon	Limestone	Jefferson
Lamar	Lamar	Madison	Lowndes	Lamar
Lauderdale	Lauderdale	Marengo	Macon	Lauderdale
Lawrence	Lawrence	Marion	Madison	Lawrence
Lee	Lee	Marshall	Marengo	Lee
Limestone	Limestone	Mobile	Marion	Limestone
Lowndes	Lowndes	Monroe	Marshall	Lowndes
Macon	Macon	Montgomery	Mobile	Macon
Madison	Madison	Morgan	Monroe	Madison
Marengo	Marengo	Perry	Montgomery	Marengo
Marion	Marion	Pickens	Morgan	Marion
Marshall	Marshall	Pike	Perry	Marshall
Mobile	Mobile	Shelby	Pickens	Mobile
Monroe	Monroe	Sumter	Pike	Monroe
Montgomery	Montgomery	Talladega	Russell	Montgomery
Morgan	Morgan	Tallapoosa	Shelby	Morgan
Perry	Perry	Tuscaloosa	Sumter	Perry
Pickens	Pickens	Walker	Talladega	Pickens
Pike	Pike	Washington	Tallapoosa	Pike
Shelby	Shelby	Wilcox	Tuscaloosa	Randolph
Sumter	Sumter		Walker	Russell
Talladega	Talladega		Washington	Shelby
Tallapoosa	Tallapoosa		Wilcox	Sumter
Tuscaloosa	Tuscaloosa		Winston	Talladega
Walker	Walker			Tallapoosa
Washington	Washington			Tuscaloosa
Wilcox	Wilcox			Walker
Winston	Winston			Washington
				Wilcox
				Winston
		ARIZONA		
Cochise	Cochise	Cochise	Cochise	Cochise
Gila	Gila	Gila	Gila	Gila
Maricopa	Maricopa	Maricopa	Maricopa	Maricopa
Pima	Pima	Pima	Pima	Pima
Yuma				
		ARKANSAS		
Arkansas [1]	Arkansas [1]	Ashley	Ashley	Ashley
Ashley	Ashley	Clark	Clark	Benton [1]
Bradley	Bradley	Conway	Conway	Clark
Clark	Chicot	Crittenden	Crittenden	Crawford [1]
Cleburne	Clark	Cross	Cross	Crittenden
Conway	Cleveland	Faulkner	Garland	Garland
Crittenden	Conway	Garland	Jackson	Jackson
Cross	Crittenden	Jackson	Jefferson	Jefferson
Desha	Cross	Jefferson	Little River	Little River
Drew	Drew	Little River	Mississippi	Mississippi
Garland	Garland	Lonoke	Monroe	Ouachita
Jackson	Jackson	Mississippi	Ouachita	Phillips
Jefferson	Jefferson	Monroe	Phillips	Pope
Little River	Lincoln	Ouachita	Pope	Pulaski
Lonoke [1]	Little River	Phillips	Pulaski	Saline
Miller	Lonoke [1]	Pope	Saline	Sebastian
Mississippi	Mississippi	Pulaski	Sebastian	Washington [1]
Monroe	Monroe	Saline	Woodruff	Woodruff
Ouachita	Ouachita	Sebastian	Yell	Yell
Perry	Phillips	Woodruff		
Phillips	Pope	Yell		
Pope	Prairie [1]			
Prairie [1]	Pulaski			

[1] 1 district of 3 counties.

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

ARKANSAS—Continued

1931	1932	1933	1934	1935
Pulaski Saline Sebastian Union White Woodruff Yell	Saline Sebastian Woodruff Yell			

CALIFORNIA

1931	1932	1933	1934	1935
Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus Yolo	Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus Yolo	Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus	Alameda Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino San Diego San Joaquin San Luis Obispo San Mateo Santa Barbara Stanislaus	Alameda Contra Costa Fresno Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino SanDiego San Joaquin San Luis Obispo San Mateo Santa Barbara Stanislaus

COLORADO

1931	1932	1933	1934	1935
Otero				

CONNECTICUT

1931	1932	1933	1934	1935
Fairfield [3]	Fairfield [3] West Hartford [3]	Fairfield [3] West Hartford [3]	Fairfield [3] West Hartford [3]	

[3] Included in 1 district of 3 counties.

DELAWARE

1931	1932	1933	1934	1935
Kent New Castle Sussex	Kent New Castle Sussex	Kent New Castle Sussex	Kent New Castle Sussex	Kent New Castle Sussex

FLORIDA

1931	1932	1933	1934	1935
Leon Taylor	Escambia Leon Taylor	Escambia Leon	Escambia Leon	Escambia Jackson Leon

GEORGIA

1931	1932	1933	1934	1935
Baldwin Bartow Bibb Brooks Catoosa [1] Chatham Chattooga [3] Clarke Cobb Coffee Colquitt Dade [3]	Baldwin Bartow Bibb Brooks Catoosa [3] Chatham Clarke Cobb Colquitt Dade [3] Decatur De Kalb	Baldwin Bartow Bibb Brooks Catoosa [4] Chatham Clarke Cobb Colquitt Decatur De Kalb Dougherty	Baldwin Bartow Bibb Camden [3] Catoosa [4] Chatham Clarke Cobb Colquitt Decatur De Kalb Dougherty	Baldwin Bartow Bibb Camden [3] Catoosa [4] Chatham Clarke Cobb Colquitt Decatur De Kalb Dougherty

[1] Included in 1 district of 4 counties.
[3] Included in 1 district of 3 counties.
[4] Included in 1 district of 2 counties.

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

GEORGIA—Continued

1931	1932	1933	1934	1935
Decatur	Dougherty	Floyd	Floyd	Floyd
De Kalb	Floyd	Fulton	Glynn [2]	Fulton
Dougherty	Fulton	Glynn [2]	Grady	Glynn [2]
Floyd	Glynn	Grady	Hall	Grady
Glynn	Grady	Hall	Jefferson	Hall
Gordon [1]	Hall	Jefferson	Jenkins	Jefferson
Grady	Jefferson	Jenkins	Laurens	Jenkins
Hall	Jenkins	Laurens	Lowndes	Laurens
Jefferson	Laurens	Lowndes	Mitchell	Lowndes
Jenkins	Lowndes	Mitchell	McIntosh [2]	Mitchell
Laurens	Mitchell	Richmond	Richmond	McIntosh [2]
Lowndes	Richmond	Spalding	Spalding	Richmond
Mitchell	Spalding	Sumter	Sumter	Spalding
Murray [1]	Sumter	Thomas	Thomas	Sumter
Richmond	Thomas	Troup	Troup	Thomas
Spalding	Troup	Walker [4]	Walker [4]	Troup
Sumter	Walker [2]	Ware	Ware	Walker [4]
Thomas	Ware	Washington	Washington	Ware
Troup	Washington			Washington
Walker [2, 3]				
Ware				
Washington				
Whitfield [1]				

[1] Included in 1 district of 4 counties.
[2] Included in 1 district of 3 counties.
[3] Walker County also included in a tricounty district.
[4] Included in 1 district of 2 counties.

IDAHO

Twin Falls	Twin Falls			

ILLINOIS

Du Page	Du Page	Du Page	Du Page	

IOWA

Des Moines	Des Moines	Woodbury	Woodbury	Woodbury
Washington	Washington			
Woodbury	Woodbury			

KANSAS

Brown	Brown	Geary	Lyon	Lyon
Butler	Geary	Lyon	Sedgwick	Sedgwick
Cherokee	Lyon	Sedgwick	Shawnee	Shawnee
Dickinson	Marion	Shawnee		
Geary	Sedgwick			
Greenwood	Shawnee			
Lyon				
Marion				
Sedgwick				
Shawnee				

KENTUCKY

Adair	Adair	Adair	Adair	Adair
Allen	Allen	Allen	Allen	Allen
Anderson	Anderson	Anderson	Anderson	Anderson
Barren	Barren	Barren	Barren	Ballard
Bath	Bath	Bath	Bath	Barren
Bell	Bell	Bell	Boyd	Bath
Boyd	Boyd	Boyd	Breathitt	Bell
Breathitt	Breathitt	Breathitt	Butler	Boyd
Bullitt	Bullitt	Bullitt	Caldwell	Breathitt
Butler	Butler	Butler	Calloway	Butler

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

KENTUCKY—Continued

1931	1932	1933	1934	1935
Caldwell	Caldwell	Caldwell	Carlisle	Caldwell
Calloway	Calloway	Calloway	Carter	Calloway
Carlisle	Carlisle	Carlisle	Casey	Carlisle
Carter	Carter	Carter	Clinton	Carter
Casey	Casey	Casey	Edmonson	Casey
Clinton	Clinton	Clinton	Elliott	Clay
Daviess	Daviess	Daviess	Estill	Clinton
Edmonson	Edmonson	Edmonson	Fayette	Edmonson
Elliott	Elliott	Elliott	Fleming	Elliott
Estill	Estill	Estill	Floyd	Estill
Fayette	Fayette	Fayette	Fulton	Fayette
Fleming	Fleming	Fleming	Gallatin	Fleming
Floyd	Floyd	Floyd	Grant	Floyd
Fulton	Fulton	Fulton	Grayson	Fulton
Gallatin	Gallatin	Gallatin	Green	Gallatin
Grant	Grant	Grant	Greenup	Grant
Grayson	Grayson	Grayson	Hart	Grayson
Green	Green	Green	Henderson	Green
Greenup	Greenup	Greenup	Hickman	Greenup
Hancock	Hancock	Hart	Hopkins	Hart
Harrison	Hart	Henderson	Jackson	Henderson
Hart	Henderson	Hickman	Jefferson	Hickman
Henderson	Hickman	Hopkins	Kenton	Hopkins
Hickman	Hopkins	Jackson	Knott	Jefferson
Hopkins	Jackson	Jefferson	Knox	Kenton
Jackson	Jefferson	Kenton	Laurel	Knott
Jefferson	Kenton	Knott	Lawrence	Knox
Kenton	Knott	Knox	Lee	Laurel
Knott	Knox	Laurel	Leslie	Lawrence
Knox	Laurel	Lawrence	Letcher	Lee
Laurel	Lawrence	Lee	Lincoln	Leslie
Lawrence	Lee	Leslie	Madison	Letcher
Lee	Leslie	Letcher	Marshall	Lincoln
Leslie	Letcher	Lincoln	Martin	Lyon
Letcher	Lewis	Madison	Mason	Madison
Lewis	Lincoln	Magoffin	McCreary	Magoffin
Lincoln	McCreary	Marshall	McLean	Marshall
McCreary	McLean	Martin	Meade	Martin
McLean	Madison	Mason	Menifee	McCracken
Madison	Magoffin	McCreary	Metcalfe	McCreary
Magoffin	Marshall	McLean	Monroe	McLean
Marshall	Martin	Meade	Muhlenberg	Meade
Martin	Mason	Menifee	Nicholas	Menifee
Mason	Meade	Monroe	Ohio	Metcalfe
Meade	Menifee	Muhlenberg	Owsley	Monroe
Menifee	Metcalfe	Nicholas	Perry	Muhlenberg
Metcalfe	Monroe	Ohio	Pike	Nicholas
Monroe	Morgan	Owsley	Powell	Ohio
Morgan	Muhlenberg	Perry	Pulaski	Owsley
Muhlenberg	Nicholas	Pike	Rockcastle	Perry
Nicholas	Ohio	Powell	Rowan	Pike
Ohio	Owsley	Pulaski	Scott	Powell
Owen	Perry	Rockcastle	Todd	Pulaski
Owsley	Pike	Rowan	Trigg	Rockcastle
Perry	Powell	Scott	Trimble	Rowan
Pike	Pulaski	Todd	Union	Scott
Powell	Robertson	Trigg	Warren	Spencer
Pulaski	Rockcastle	Trimble	Wayne	Todd
Robertson	Rowan	Union	Webster	Trigg
Rockcastle	Scott	Warren	Wolfe	Trimble
Rowan	Todd	Wayne		Union
Scott	Trigg	Webster		Warren
Todd	Trimble	Wolfe		Wayne
Trigg	Union			Webster
Trimble	Warren			Wolfe
Union	Wayne			
Warren	Webster			
Wayne	Whitley			
Webster	Wolfe			
Whitley				
Wolfe				

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TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

LOUISIANA [1]

1931	1932	1933	1934	1935
Assumption	Assumption	Assumption	Assumption	Acadia
Avoyelles	Avoyelles	Avoyelles	Avoyelles	Assumption
Caddo	Caddo	Caddo	Caddo	Avoyelles
Caldwell	Caldwell	Caldwell	Caldwell	Caddo
Catahoula	Catahoula	Catahoula	Catahoula	Caldwell
Claiborne	Claiborne	Claiborne	Claiborne	Catahoula
Concordia	Concordia	Concordia	Concordia	Claiborne
De Soto	De Soto	De Soto	De Soto	Concordia
East Carroll	East Carroll	East Carroll	East Carroll	De Soto
Evangeline	Franklin	Franklin	Franklin	East Carroll
Franklin	Iberia	Iberia	Iberia	Franklin
Iberia	Iberville	Iberville	Iberville	Iberia
Iberville	Lafayette	Lafayette	Lafayette	Iberville
Lafayette	Lafourche	Lafourche	Lafourche	Jefferson Davis
Lafourche	La Salle	La Salle	La Salle	Lafayette
La Salle	Lincoln	Lincoln	Lincoln	Lafourche
Lincoln	Madison	Madison	Madison	La Salle
Madison	Morehouse	Morehouse	Morehouse	Lincoln
Morehouse	Natchitoches	Natchitoches	Natchitoches	Madison
Natchitoches	Ouachita	Ouachita	Ouachita	Morehouse
Ouachita	Pointe Coupee	Pointe Coupee	Pointe Coupee	Natchitoches
Pointe Coupee	Rapides	Rapides	Rapides	Ouachita
Rapides	Richland	Richland	Red River	Pointe Coupee
Richland	St. Landry	St. Landry	Richland	Rapides
St. Landry	St Martin	St. Martin	St. Landry	Red River
St. Martin	St Mary	St. Mary	St. Martin	Richland
St. Mary	Tensas	Tensas	St. Mary	St. Landry
Tensas	Terrebonne	Terrebonne	Tensas	St. Martin
Terrebonne	Washington	Washington	Terrebonne	St. Mary
Washington	Webster	Webster	Washington	Tensas
Webster	West Carroll	West Carroll	Webster	Terrebonne
West Carroll			West Carroll	Washington
				Webster
				West Carroll

[1] Parishes.

MAINE

1931	1932	1933	1934	1935
Bar Harbor	Bar Harbor	Bar Harbor	Bar Harbor	Cooperative Health Union [6]
Bucksport	Cooperative Health Union [4]	Cooperative Health Union [5]	Cooperative Health Union [5]	Motbov Union [2]
Cooperative Health Union [4]	Motbov Union [2]	Motbov Union [2]	Motbov Union [2]	
Motbov Union [2]	Rumford [3]	Rumford [3]	Rumford [3]	
Rumford [3]	Sanford [3]	Sanford [3]	Sanford [3]	
Sanford [3]				

[2] Including municipalities of Orono, Milford, Bradley, Veazie and Old Town.
[3] Town (township) wholly or partly rural.
[4] Including towns of Avon, Chesterville, Eustis, Livermore, Phillips, Rangeley, Strong, Temple, Weld, and Wilton.
[5] Including towns of Avon, Chesterville, Dallas Pl., Eustis, Farmington, Industry, Livermore, Lang Pl., New Sharon, Rangeley, Sandy River Pl., Strong, Temple, and Weld. (Farmington, Industry, Dallas Pl., New Sharon added in 1934.)
[6] Including towns of Avon, Carthage, Chesterville, Coplin Pl., Dallas Pl., Dead River, Eustis, Farmington, Flagstaff, Industry, Livermore, Lang Pl., New Sharon, New Vineyard, Phillips (in winter) Rangeley, Sandy River Pl., Strong, Salem, Temple, and Weld.

MARYLAND

1931	1932	1933	1934	1935
Allegany	Allegany	Allegany	Allegany	Allegany
Anne Arundel	Anne Arundel	Anne Arundel	Anne Arundel	Anne Arundel
Baltimore	Baltimore	Baltimore	Baltimore	Baltimore
Calvert	Calvert	Calvert	Calvert	Calvert
Carroll	Carroll	Carroll	Caroline	Caroline
Cecil	Cecil	Cecil	Carroll	Carroll
Dorchester	Charles	Charles	Cecil	Cecil
Frederick	Dorchester	Dorchester	Charles	Charles
Garrett	Frederick	Frederick	Dorchester	Dorchester
Harford	Garrett	Garrett	Frederick	Frederick
Kent	Harford	Harford	Garrett	Garrett
Montgomery	Howard	Howard	Harford	Harford
Prince Georges	Kent	Kent	Howard	Howard
Queen Annes	Montgomery	Montgomery	Kent	Kent

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

MARYLAND—Continued

1931	1932	1933	1934	1935
Talbot	Prince Georges	Prince Georges	Montgomery	Montgomery
Washington	Queen Annes	Queen Annes	Prince Georges	Prince Georges
Wicomico	Somerset	St. Marys	Queen Annes	Queen Annes
Worcester	Talbot	Somerset	St Marys	St. Marys
	Washington	Talbot	Somerset	Somerset
	Wicomico	Washington	Talbot	Talbot
	Worcester	Wicomico	Washington	Washington
		Worcester	Wicomico	Wicomico
			Worcester	Worcester

MASSACHUSETTS

Barnstable	Barnstable	Barnstable	Barnstable	Barnstable
Nashoba	Nashoba [1]	Nashoba [1]	Nashoba [1]	Nashoba [1]
Southern Berkshire	Southern Berkshire [2]	Southern Berkshire [2]	Southern Berkshire [2]	Southern Berkshire [2]

[1] Represents 11 towns.
[2] Represents 9 towns.

MICHIGAN

Alcona [3]	Alcona [3]	Alcona [3]	Alcona [3]	Alcona [3]
Alpena [3]	Allegan	Allegan	Allegan	Allegan
Antrim [3]	Alpena [3]	Alpena [3]	Alpena [3]	Alpena [3]
Barry	Antrim [3]	Antrim [3]	Antrim [3]	Antrim [3]
Charlevoix [2]	Barry	Barry	Barry	Arenac [2]
Cheboygan [3]	Charlevoix [3]	Charlevoix [3]	Charlevoix [3]	Barry
Crawford [3]	Cheboygan [3]	Cheboygan [3]	Cheboygan [3]	Branch
Emmet [3]	Crawford [3]	Crawford [3]	Crawford [3]	Clare [2]
Genesee	Emmet [3]	Eaton	Eaton	Charlevoix [3]
Iosco [3]	Genesee	Emmet [3]	Emmet [3]	Cheboygan [3]
Isabella	Iosco [3]	Genesee	Genesee	Crawford [3]
Kalkaska [3]	Isabella	Iosco [3]	Grosse Pointe [5]	Eaton
Kent	Kalkaska [3]	Isabella	Hillsdale	Emmet [3]
Midland	Kent	Kalkaska [3]	Iosco [3]	Genesee
Missaukee [3]	Lake [4]	Kent	Isabella	Gladwin [2]
Montmorency [3]	Midland	Lake [4]	Kalkaska [3]	Hillsdale
Oakland	Missaukee [3]	Midland	Kent	Iosco [3]
Ogemaw [3]	Montmorency [3]	Missaukee [3]	Lake [4]	Isabella
Oscoda [3]	Newaygo [4]	Montmorency [3]	Midland	Kalkaska [3]
Otsego [3]	Oakland	Newaygo [4]	Missaukee [3]	Kent
Ottawa	Oceana [4]	Oakland	Montmorency [3]	Lake [2]
Presque Isle [3]	Ogemaw [3]	Oceana [4]	Newaygo [4]	Luce [2]
Roscommon [3]	Oscoda [3]	Ogemaw [3]	Oakland	Mackinac [2]
Saginaw	Otsego [3]	Oscoda [3]	Oceana [4]	Midland
Wexford	Ottawa	Otsego [3]	Ogemaw [3]	Missaukee [3]
	Presque Isle [3]	Ottawa	Oscoda [3]	Montmorency [3]
	Roscommon [3]	Presque Isle [3]	Otsego [3]	Newaygo [2]
	Saginaw	Roscommon [3]	Ottawa	Oakland
	Wexford	Saginaw	Presque Isle [3]	Oceana [2]
		Wexford	Roscommon [3]	Ogemaw [3]
			Saginaw	Oscoda [3]
			Van Buren	Otsego [3]
			Wexford	Ottawa
				Presque Isle [3]
				Roscommon [3]
				Saginaw
				Schoolcraft [2]
				Van Buren
				Wexford

[2] Included in 3 districts of 3 counties each.
[3] Included in 4 districts of 4 counties each.
[4] Included in 1 district of 3 counties.

MINNESOTA

St. Louis	St. Louis	St. Louis	St. Louis	St. Louis

Table 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

MISSISSIPPI

1931	1932	1933	1934	1935
Adams	Adams	Adams	Adams	Adams
Bolivar	Bolivar	Bolivar	Bolivar	Bolivar
Clarke	Coahoma	Coahoma	Coahoma	Coahoma
Coahoma	Copiah	Forrest	Copiah	Copiah
Copiah	Forrest	Hancock	Forrest	Forrest
Forrest	Hancock	Harrison	Hancock	Hancock
Hancock	Harrison	Hinds	Harrison	Harrison
Harrison	Hinds	Holmes	Hinds	Hinds
Hinds	Holmes	Humphreys	Holmes	Holmes
Holmes	Humphreys	Jackson	Humphreys	Humphreys
Humphreys	Jackson	Lamar	Jackson	Jackson
Issaquena	Lamar	Lauderdale	Lamar	Lamar
Jackson	Lauderdale	Lee	Lauderdale	Lauderdale
Lamar	Lee	Leflore	Lee	Lee
Lauderdale	Leflore	Lincoln	Leflore	Leflore
Lee	Lincoln	Monroe	Lincoln	Lincoln
Leflore	Monroe	Pearl River	Monroe	Monroe
Lincoln	Pearl River	Pike	Pearl River	Pearl River
Monroe	Perry	Sharkey	Pike	Pike
Pearl River	Pike	Sunflower	Sharkey	Sharkey
Perry	Sunflower	Union	Sunflower	Sunflower
Pike	Union	Warren	Union	Union
Sharkey	Warren	Washington	Warren	Warren
Sunflower	Washington	Yazoo	Washington	Washington
Tishomingo	Yazoo		Yazoo	Yazoo
Union				
Warren				
Washington				
Yazoo				

MISSOURI

1931	1932	1933	1934	1935
Boone	Boone	Buchanan	Buchanan	Buchanan
Buchanan	Buchanan	Dunklin	Dunklin	Dunklin
Dunklin	Dunklin	Greene	Greene	Greene
Greene	Greene	Jackson	Jackson	Jackson
Jackson	Jackson	Marion	Marion	Marion
Marion	Marion	Miller	Miller	Miller
Miller	Miller	New Madrid	New Madrid	
New Madrid	New Madrid	Pemiscot	St. Louis	
Pemiscot	Pemiscot	St. Louis		
St. Louis	St. Louis			
Scott				

MONTANA

1931	1932	1933	1934	1935
Cascade	Cascade	Cascade	Cascade	Cascade
Gallatin	Gallatin	Gallatin	Gallatin	Gallatin
Lewis and Clark	Lewis and Clark	Lewis and Clark	Lewis and Clark	Missoula
Missoula	Missoula	Missoula	Missoula	

NEW MEXICO

1931	1932	1933	1934	1935
Bernalillo	Bernalillo	Bernalillo	Bernalillo	Bernalillo [1]
Dona Ana	Dona Ana	Dona Ana	Dona Ana	Catron [3]
Eddy	Eddy	Eddy	Eddy	Chaves [3]
Santa Fe	Santa Fe	Santa Fe	Santa Fe	Colfax [2]
Union	Union	Union	Union	Curry [3]
Valencia	Valencia	Valencia	Valencia	De Baca [3]
				Dona Ana [3]
				Eddy [3]
				Grant [3]
				Guadalupe [3]
				Harding [2]
				Hidalgo [2]
				Lea [3]
				Lincoln [3]
				Luna [2]
				McKinley [1]

[1] Including 3 districts of 2 counties each.
[2] Including 3 districts of 3 counties each.
[3] Including 4 districts of 4 counties each.

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

NEW MEXICO—Continued

1931	1932	1933	1934	1935
				Mora [1]
				Otero [3]
				Quay [3]
				Rio Arriba [2]
				Roosevelt [3]
				Sandoval [1]
				San Juan [1]
				San Miguel [1]
				Santa Fe [2]
				Sierra [3]
				Socorro [3]
				Taos [2]
				Torrance [3]
				Union [2]
				Valencia [3]

[1] Including 3 districts of 2 counties each.
[2] Including 3 districts of 3 counties each.
[3] Including 4 districts of 4 counties each.

NEW YORK

Cattaraugus	Cattaraugus	Cattaraugus	Cattaraugus	Cattaraugus
Cortland	Cortland	Columbia	Columbia	Columbia
Suffolk	Suffolk	Cortland	Cortland	Cortland
Westchester	Westchester	Suffolk	Suffolk	Suffolk
		Westchester	Westchester	Westchester

NORTH CAROLINA

Beaufort	Beaufort	Beaufort	Beaufort	Avery [1]
Bladen	Bladen	Bladen	Bertie	Beaufort
Buncombe	Buncombe	Buncombe	Bladen	Bertie
Cabarrus	Cabarrus	Cabarrus	Buncombe	Brunswick
Columbus	Columbus	Columbus	Cabarrus	Buncombe
Cumberland	Cumberland	Cumberland	Columbus	Cabarrus
Davidson	Davidson	Davidson	Cumberland	Caldwell
Durham	Durham	Durham	Davidson	Columbus
Edgecombe	Edgecombe	Edgecombe	Duplin	Craven
Forsyth	Forsyth [1]	Forsyth [1]	Durham	Cumberland
Franklin	Franklin	Franklin	Edgecombe	Davidson
Gaston	Gaston	Gaston	Forsyth [1]	Duplin
Granville	Granville	Granville	Franklin	Durham
Guilford	Guilford	Guilford	Gaston	Edgecombe
Halifax	Halifax	Halifax	Granville	Forsyth [1]
Johnston	Lenoir	Hyde	Guilford	Franklin
Lenoir	Mecklenburg	Lenoir	Halifax	Gaston
Mecklenburg	Moore	Mecklenburg	Haywood [2]	Graham [2]
Moore	New Hanover	Moore	Hyde	Granville
New Hanover	Northampton	Nash	Jackson [2]	Guilford
Northampton	Pitt	New Hanover	Lenoir	Halifax
Pitt	Randolph	Northampton	Mecklenburg	Haywood [2]
Randolph	Richmond	Pitt	Moore	Hyde
Richmond	Robeson	Randolph	New Hanover	Jackson [2]
Robeson	Rowan	Richmond	Northampton	Lenoir
Rowan	Rutherford	Robeson	Pitt	Macon [2]
Rutherford	Sampson	Rowan	Randolph	Mecklenburg
Sampson	Stokes [1]	Sampson	Richmond	Moore
Stokes	Surry	Stokes [1]	Robeson	Nash
Surry	Vance	Surry	Rowan	New Hanover
Vance	Wake	Vance	Rutherford	Northampton
Wake	Wayne	Wake	Sampson	Orange
Wayne	Wilkes	Wayne	Stokes [1]	Pamlico
Wilkes	Wilson	Wilkes	Surry	Person
Wilson	Yadkin	Wilson	Swain [2]	Pitt
Yadkin		Yadkin	Vance	Polk
			Wake	Randolph
			Wayne	Richmond
			Wilkes	Robeson
			Wilson	Rowan
			Yadkin [1]	Rutherford

[1] Included in 2 districts of 3 counties each.
[2] Included in 1 district of 5 counties.

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

NORTH CAROLINA—Continued

1931	1932	1933	1934	1935
				Sampson
				Stokes [1]
				Surry
				Swain [2]
				Vance
				Wake
				Watauga [1]
				Wayne
				Wilkes
				Wilson
				Yadkin [1]
				Yancey [1]

[1] Included in 2 districts of 3 counties each.
[2] Included in 1 district of 5 counties.

OHIO

1931	1932	1933	1934	1935
Allen	Allen	Allen	Allen	Athens
Ashtabula	Ashtabula	Belmont	Athens	Butler
Belmont	Belmont	Butler	Butler	Clinton
Butler	Butler	Clinton	Clinton	Crawford
Clinton	Clinton	Coshocton	Coshocton	Cuyahoga
Columbiana	Columbiana	Crawford	Crawford	Darke
Coshocton	Coshocton	Cuyahoga	Cuyahoga	Delaware
Crawford	Crawford	Darke	Darke	Erie
Cuyahoga	Cuyahoga	Delaware	Delaware	Fayette
Darke	Darke	Erie	Erie	Guernsey
Delaware	Delaware	Fayette	Fayette	Hamilton
Erie	Erie	Hamilton	Hamilton	Hancock
Fayette	Fayette	Hancock	Hancock	Hocking
Franklin	Franklin	Hocking	Hocking	Huron
Guernsey	Hamilton	Huron	Huron	Jefferson
Hamilton	Hancock	Jefferson	Jefferson	Lorain
Hancock	Hocking	Lorain	Lorain	Lucas
Hocking	Huron	Lucas	Lucas	Madison
Huron	Jackson	Mahoning	Mahoning	Mahoning
Jackson	Jefferson	Marion	Marion	Marion
Jefferson	Lorain	Medina	Medina	Medina
Lorain	Lucas	Meigs	Meigs	Meigs
Lucas	Mahoning	Mercer	Mercer	Mercer
Mahoning	Marion	Miami	Miami	Miami
Marion	Medina	Montgomery	Montgomery	Montgomery
Medina	Meigs	Perry	Perry	Perry
Meigs	Mercer	Pickaway	Pickaway	Pickaway
Mercer	Miami	Preble	Preble	Preble
Miami	Montgomery	Richland	Richland	Richland
Montgomery	Morrow	Ross	Ross	Ross
Morrow	Perry	Scioto	Seneca	Seneca
Perry	Pickaway	Seneca	Shelby	Shelby
Pickaway	Preble	Shelby	Stark	Stark
Preble	Richland	Stark	Summit	Summit
Richland	Ross	Summit	Trumbull	Trumbull
Ross	Scioto	Trumbull	Tuscarawas	Tuscarawas
Scioto	Seneca	Tuscarawas	Washington	Washington
Seneca	Shelby	Washington	Wayne	Wayne
Shelby	Stark	Wayne	Wood	Wood
Stark	Summit	Wood		Wyandot
Summit	Trumbull			
Trumbull	Tuscarawas			
Tuscarawas	Washington			
Washington	Wayne			
Wayne	Wood			
Wood				

OKLAHOMA

1931	1932	1933	1934	1935
Carter			Le Flore	Le Flore
Le Flore				Seminole
McCurtain				
Muskogee				
Okmulgee				
Ottawa				
Pittsburg				
Pottawatomie				
Seminole				

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

OREGON

1931	1932	1933	1934	1935
Clackamas	Clackamas	Clackamas	Clackamas	Clackamas
Coos	Coos	Jackson	Douglas	Douglas
Douglas	Douglas	Klamath	Jackson	Jackson
Jackson	Jackson	Lane	Klamath	Klamath
Klamath	Klamath	Marion	Lane	Lane
Lane	Lane	Multnomah	Marion	Marion
Marion	Marion		Multnomah	
Multnomah				

PENNSYLVANIA

1931	1932	1933	1934	1935
Allegheny	Allegheny	Allegheny		
Bucks	Bucks	Bucks		
Luzerne	Luzerne	Luzerne		

SOUTH CAROLINA

1931	1932	1933	1934	1935
Aiken	Aiken	Aiken	Aiken	Aiken
Anderson	Anderson	Anderson	Anderson	Anderson
Beaufort	Beaufort	Beaufort	Beaufort	Beaufort
Berkeley	Berkeley	Berkeley	Berkeley	Berkeley
Charleston	Charleston	Charleston	Charleston	Charleston
Cherokee	Cherokee	Cherokee	Cherokee	Cherokee
Darlington	Darlington	Darlington	Darlington	Darlington
Dillon	Dillon	Dillon [1]	Dillon [1]	Dillon [1]
Dorchester	Dorchester	Dorchester	Dorchester	Dorchester
Fairfield	Fairfield	Fairfield	Fairfield	Fairfield
Florence	Florence	Florence	Florence	Florence
Georgetown	Georgetown	Georgetown	Georgetown	Georgetown
Greenville	Greenville	Greenville	Greenville	Greenville
Greenwood	Greenwood	Greenwood	Greenwood	Greenwood
Horry	Horry	Horry	Horry	Horry
Kershaw	Kershaw	Kershaw	Kershaw	Kershaw
Lexington	Lexington	Marion [1]	Marion [1]	Marion [1]
Marion	Marion	Newberry	Newberry	Newberry
Newberry	Newberry	Oconee	Oconee	Oconee
Oconee	Oconee	Orangeburg	Orangeburg	Orangeburg
Orangeburg	Orangeburg	Pickens	Pickens	Pickens
Pickens	Pickens	Richland	Richland	Richland
Richland	Richland	Spartanburg	Spartanburg	Spartanburg
Spartanburg	Spartanburg			

SOUTH DAKOTA

1931	1932	1933	1934	1935
Pennington	Pennington	Pennington		

TENNESSEE

1931	1932	1933	1934	1935
Bledsoe [2]	Bledsoe [2]	Bledsoe	Anderson [5]	Bledsoe [4]
Blount	Bradley	Bradley	Bledsoe [5]	Blount
Bradley	Carter	Davidson	Blount	Bradley
Carter	Clay [2]	Dyer	Bradley	Carter [4]
Clay [2]	Davidson [3]	Fentress [4]	Campbell [5]	Davidson
Cumberland	Dyer	Gibson	Carter [5]	Fentress [4]
Davidson [3]	Fentress [3]	Giles	Davidson	Gibson
Dyer	Gibson	Greene	Dyer	Giles
Fentress [3]	Giles	Grundy [4]	Fentress [5]	Greene
Gibson	Greene	Hamilton	Gibson	Grundy
Giles	Grundy [2]	Hardeman	Giles	Hamilton
Greene	Hamilton	Humphreys	Greene	Hardeman
Grundy [2]	Hardeman	Jackson [4]	Grundy	Humphreys
Hamilton	Humphreys	Knox	Hamilton	Jackson [4]
Hardeman	Jackson [3]	Lake	Hardeman	Knox
Humphreys	Knox	Lauderdale	Humphreys	Lake
Jackson [3]	Lake	Lincoln	Jackson [5]	Lauderdale

[2] Included in 1 district of 3 counties.
[3] Included in 4 districts of 2 counties each.
[4] Included in 3 districts of 2 counties each.
[5] Included in 5 districts of 2 counties each.

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

TENNESSEE—Continued

1931	1932	1933	1934	1935
Knox	Lauderdale	Maury	Knox	Lincoln
Lake	Lewis	Meigs [4]	Lake	Maury
Lauderdale	Lincoln	Montgomery	Lauderdale	Meigs
Lewis	Maury	Obion	Lincoln	Montgomery
Lincoln	Meigs [3]	Rhea [4]	Maury	Obion
Maury	Monroe	Roane	Meigs [5]	Rhea
Meigs [3]	Montgomery	Rutherford	Montgomery	Roane
Monroe	Obion	Sequatchie [4]	Obion	Rutherford
Montgomery	Overton [3]	Sevier	Rhea [5]	Sequatchie [4]
Obion	Pickett [3]	Shelby	Roane	Sevier
Overton [3]	Rhea [3]	Sullivan	Rutherford	Shelby
Pickett [3]	Roane	Sumner	Sequatchie [5]	Sullivan
Rhea [2]	Rutherford	Tipton	Sevier	Sumner
Roane	Sequatchie [2]	Washington	Shelby	Tipton
Rutherford	Sevier	Weakley	Sullivan	Unicoi
Sequatchie [2]	Shelby	Williamson	Sumner	Washington
Sevier	Sullivan	Wilson	Tipton	Weakley
Shelby	Sumner		Unicoi [5]	Williamson
Sullivan	Tipton		Washington	Wilson
Sumner	Unicoi		Weakley	
Tipton	Washington		Williamson	
Unicoi	Weakley		Wilson	
Washington	Williamson			
Weakley	Wilson			
Williamson				
Wilson				

[2] Included in 1 district of 3 counties.
[3] Included in 4 districts of 2 counties each.
[4] Included in 3 districts of 2 counties each.
[5] Included in 5 districts of 2 counties each.

TEXAS

Cameron [6]	Cameron	Dallas	Dallas	Cameron
Cass	Gregg	El Paso	El Paso	Culberson [1]
Hidalgo [6]	Hidalgo	Gregg	Gregg	Dallas
Jefferson	McLennan	Hidalgo	Hidalgo	El Paso [1]
McLennan	Nolan	McLennan	Nolan	Hidalgo
Nolan	Potter	Nolan	Potter	Hudspeth [1]
Potter	Starr	Potter	Tarrant	Nolan
Starr [6]	Tarrant	Tarrant		Potter
Willacy [6]				Tarrant

[1] 1 district of 3 counties.
[6] Included in 1 district of 4 counties.

UTAH

Davis	Davis	Davis	Davis	Davis
Utah	Utah	Utah	Utah	

VIRGINIA

Accomac [2]	Accomac [2]	Albemarle	Albemarle	Albemarle
Albemarle	Albemarle	Arlington	Arlington	Alleghany [1]
Amelia [1]	Amelia [1]	Augusta	Augusta	Arlington
Appomattox [1]	Appomattox [1]	Brunswick [3]	Brunswick [3]	Augusta
Arlington	Arlington	Fairfax	Fairfax	Bath [1]
Augusta	Augusta	Greensville [3]	Greensville [3]	Brunswick [1]
Brunswick [2]	Brunswick [2]	Halifax	Halifax	Buckingham [1]
Buckingham [1]	Buckingham [1]	Henrico	Henrico	Dickinson [2]
Charlotte [1]	Charlotte [1]	Isle of Wight [3]	Isle of Wight [3]	Elizabeth City [2]
Cumberland [1]	Cumberland [1]	Nansemond [3]	Nansemond [3]	Fairfax
Fairfax	Fairfax	Norfolk [3]	Norfolk [3]	Greene [2]

[1] Included in 3 districts of 3 counties each.
[2] Included in 2 districts of 4 counties each.
[3] Included in 1 district of 7 counties.

TABLE 1.—*Counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1931 to 1935, as of Dec. 31*—Continued

VIRGINIA—Continued

1931	1932	1933	1934	1935
Greensville [2] Halifax Henrico Isle of Wight [2] Lunenburg [1] Nansemond [2] Norfolk [2] Northampton [2] Nottoway [1] Pittsylvania Powhatan [1] Prince Edward [1] Princess Anne [2] Rockbridge Southampton Wise	Greensville [2] Halifax Henrico Isle of Wight [2] Lunenburg [1] Nansemond [2] Norfolk [2] Nottoway [1] Pittsylvania Powhatan [1] Prince Edward [1] Princess Anne [2] Rockbridge Southampton	Pittsylvania Prince Edward Princess Anne [2] Rockbridge Southampton	Nottoway [1] Pittsylvania Prince Edward [2] Princess Anne [2] Rockbridge Southampton	Greensville [1] Halifax [4] Hanover Henrico Isle of Wight [4] James City [2] Lee [2] Madison [3] Mecklenburg [1] Montgomery Nansemond [4] Norfolk [4] Northampton Nottoway [1] Page [3] Pittsylvania [4] Prince Edward [1] Princess Anne [4] Rappahannock [3] Rockbridge [1] Rockingham [3] Scott [2] Shenandoah [3] Southampton Warren [3] Warwick [2] Wise [2] Wythe York [2]

[1] Included in 3 districts of 3 counties each.
[2] Included in 2 districts of 4 counties each.
[3] Included in 1 district of 7 counties each.
[4] Included in 3 districts of 2 counties each.

WASHINGTON

1931	1932	1933	1934	1935
Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clallam Clark King Snohomish Spokane Walla Walla Yakima

WEST VIRGINIA

1931	1932	1933	1934	1935
Berkeley Boone Brooke Doddridge [1] Fayette Hancock Harrison Kanawha Logan Marion Marshall Monongalia Ohio Pleasants [1] Preston Raleigh Ritchie [1] Tyler [1] Wetzel [1] Wood	Berkeley Boone Brooke Fayette Hancock Harrison Kanawha Logan Marion Marshall Monongalia Ohio Preston Raleigh Wood	Berkeley Boone Fayette Hancock Harrison Kanawha Logan Marshall Monongalia Ohio Preston Raleigh Wood	Berkeley Boone Fayette Hancock Harrison Kanawha Logan Marshall Monongalia Ohio Preston Raleigh Wood	Berkeley Boone Brooke Fayette Hancock Harrison Kanawha Logan Marshall Monongalia Ohio Preston Raleigh Wood

[1] Included in 1 district of 5 counties.

Table 2, a résumé of table 1, indicates the number of whole-time county, township, or district health units in each of 38 States during the years 1931 to 1935, inclusive. There is also shown the increase

or decrease from year to year of whole-time units in each of these States. It will be noted that there was a gain of 71 whole-time units in 1935 over 1934.

TABLE 2.—*Résumé of table 1*

	Number of counties					Increase or decrease in—			
	Jan. 1, 1932	Dec 31, 1932	Dec 31, 1933	Dec 31, 1934	Dec 31, 1935	1932	1933	1934	1935
Alabama	54	54	46	50	56	--------	−8	+4	+6
Arizona	5	4	4	4	4	−1	--------	--------	--------
Arkansas	30	27	21	19	19	−3	−6	−2	--------
California	14	14	13	15	16	--------	−1	+2	+1
Colorado	1	--------	--------	--------	--------	−1	--------	--------	--------
Connecticut	1	2	2	2	--------	+1	--------	--------	−2
Delaware	3	3	3	3	3	--------	--------	--------	--------
Florida	2	3	2	2	3	+1	−1	--------	+1
Georgia	35	81	30	30	31	−4	−1	--------	+1
Idaho	1	1	--------	--------	--------	--------	−1	--------	--------
Illinois	1	1	1	1	--------	--------	--------	--------	−1
Iowa	3	3	1	1	1	--------	−2	--------	--------
Kansas	10	6	4	3	3	−4	−2	−1	--------
Kentucky	81	79	73	70	76	−2	−6	−3	+6
Louisiana	32	31	81	32	34	−1	--------	+1	+2
Maine	6	5	5	5	2	−1	--------	--------	−3
Maryland	18	21	22	23	23	+3	+1	+1	--------
Massachusetts	3	3	3	3	3	--------	--------	--------	--------
Michigan	25	29	30	32	38	+4	+1	+2	+6
Minnesota	1	1	1	1	1	--------	--------	--------	--------
Mississippi	29	25	24	25	25	−4	−1	+1	--------
Missouri	11	10	9	8	5	−1	−1	−1	−3
Montana	4	4	4	4	3	--------	--------	--------	−1
New Mexico	6	6	6	6	31	--------	--------	--------	+25
New York	4	4	5	5	5	--------	+1	--------	--------
North Carolina	36	35	36	41	53	−1	+1	+5	+12
Ohio	46	45	40	39	40	−1	−5	−1	+1
Oklahoma	9	--------	--------	1	2	−9	--------	+1	+1
Oregon	8	7	6	7	6	−1	−1	+1	−1
Pennsylvania	3	3	3	--------	--------	--------	--------	−3	--------
South Carolina	24	24	23	23	23	--------	−1	--------	--------
South Dakota	1	1	1	--------	--------	--------	--------	−1	--------
Tennessee	43	41	34	39	34	−2	−7	+5	−5
Texas	9	8	8	7	9	−1	--------	−1	+2
Utah	2	2	2	2	1	--------	--------	--------	−1
Virginia	27	25	16	17	40	−2	−9	+1	+23
Washington	8	8	8	6	8	--------	--------	--------	--------
West Virginia	20	15	13	13	14	−5	−2	--------	+1
Total	616	581	530	541	612	−35	−51	+10	+71

The accompanying map shows the location of the counties, townships, or districts in the United States with health service for rural areas, under the direction of whole-time local health officers, on December 31, 1935.

From January 1, 1935, to December 31, 1935, whole-time health service was established in 88 units and was discontinued in 17—a net gain of 71. The greatest gains were in the State of New Mexico, in which whole-time health service was established in 25 counties, and in the State of Virginia, in which whole-time health service was established in 23 counties.

Delaware, Maryland, and New Mexico lead in the percentage of rural population under whole-time health service, all of their counties having been provided with whole-time local health organizations. The health units in Delaware have been provided by the State, whereas those in Maryland and New Mexico are maintained by the

local governments, with or without assistance from the State health departments or other sources.

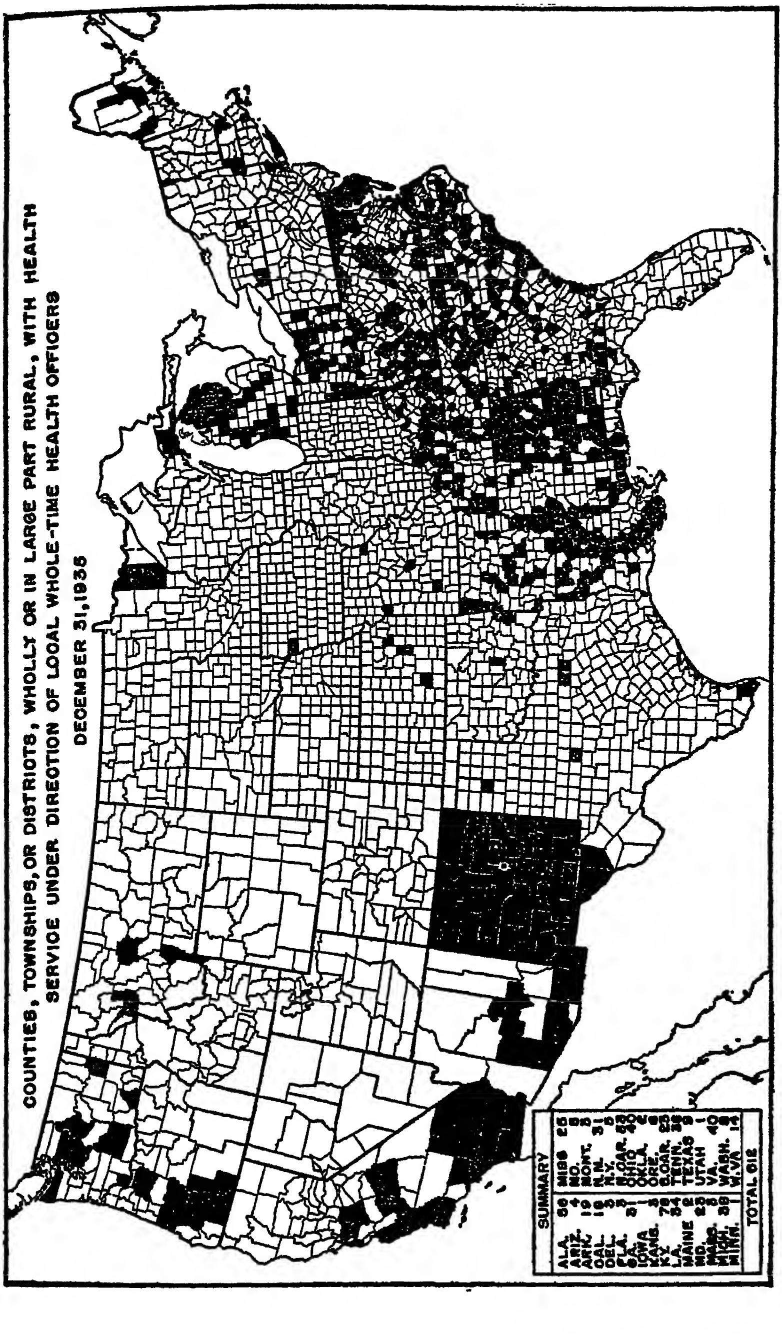

FIGURE 1.—Rural areas (in black) having whole-time health officers, December 31, 1935.

TABLE 3.—*Percentage of rural population having on Dec. 31, 1935, health service under local whole-time health officers*

State	Rural population as of Dec. 31, 1935 (estimate from 1930 census)	Rural population with local health service under direction of whole-time health officers	Percentages of rural population with local health service under direction of whole-time health officers
Alabama	1,937,382	1,684,695	87.0
Arizona	324,469	185,743	57.2
Arkansas	1,477,155	519,447	35.2
California	1,753,113	998,848	57.0
Colorado	532,479	0	0.0
Connecticut	492,433	0	0.0
Delaware	122,526	122,526	100.0
Florida	762,167	64,168	8.4
Georgia	2,013,016	571,243	28.4
Idaho	317,037	0	0.0
Illinois	1,904,927	0	0.0
Indiana	1,442,611	0	0.0
Iowa	1,401,647	23,350	1.6
Kansas	1,151,165	65,644	5.7
Kentucky	1,833,781	1,232,576	67.2
Louisiana	1,322,876	796,472	60.2
Maine	480,109	26,410	5.5
Maryland	699,524	699,524	100.0
Massachusetts	539,399	57,726	10.7
Michigan	1,603,862	636,332	40.0
Minnesota	1,306,337	48,313	3.7
Mississippi	1,738,551	696,566	40.1
Missouri	1,770,248	168,444	9.5
Montana	356,570	28,718	8.1
Nebraska	892,300	0	0.0
Nevada	56,594	0	0.0
New Hampshire	208,421	0	0.0
New Jersey	713,942	0	0.0
New Mexico	328,344	328,344	100.0
New York	2,217,953	330,304	14.9
North Carolina	2,524,017	1,593,201	63.1
North Dakota	572,535	0	0.0
Ohio	2,171,340	1,143,263	52.7
Oklahoma	1,622,351	114,028	7.0
Oregon	504,244	184,355	36.6
Pennsylvania	3,097,139	0	0.0
Rhode Island	72,740	0	0.0
South Carolina	1,367,685	834,611	61.0
South Dakota	577,238	0	0.0
Tennessee	1,720,018	825,242	48.0
Texas	3,595,144	219,271	6.1
Utah	245,942	11,450	4.7
Vermont	210,845	0	0.0
Virginia	1,636,937	815,345	49.8
Washington	718,008	318,265	44.3
West Virginia	1,257,923	555,081	44.1
Wisconsin	1,385,163	0	0.0
Wyoming	165,708	0	0.0
Total	55,356,725	15,890,507	28.7

Table 3 presents, by States, the percentage of rural population having health service under the direction of local whole-time health officers at the end of the calendar year 1935.

Of the 612 counties, townships, or districts with health service under whole-time local health officers at the close of 1935, 587, or 95.3 percent, were receiving financial assistance for the support of their health service from one or more of the following agencies: The State Board of Health, the United States Public Health Service, the Rockefeller Foundation, the American Red Cross, the American Women's Hospital Fund, the Rosenwald Fund, the Commonwealth Fund, and the Milbank Memorial Fund.

The accompanying chart shows, by States, the number of counties, townships, or districts with health service under the direction of whole-time local health officers from 1931–35, and the percentage of the rural population of each State receiving such service at the close of the calendar year 1935. There also is shown the total number of counties, townships, or districts in the United States having whole-time local health service, together with the percentage of the rural population of the entire United States served by whole-time local health organizations.

STATE	WHOLE-TIME COUNTY OR LOCAL DISTRICT HEALTH UNITS					
	JAN 1	DEC 31				
	1932	1932	1933	1934	1935	%
1 DELAWARE	3	3	3	3	3	100.0
2 MARYLAND	18	21	21	22	23	100.0
3 NEW MEXICO	6	6	6	6	31	100.0
4 ALABAMA	54	54	46	50	56	87.0
5 KENTUCKY	81	79	73	70	76	67.2
6 N CAROLINA	36	35	36	41	53	63.1
7 S CAROLINA	24	24	23	23	23	61.0
8 LOUISIANA	32	31	31	32	34	60.0
9 ARIZONA	5	4	4	4	4	57.2
10 CALIFORNIA	14	14	13	15	16	57.0
11 OHIO	46	45	40	39	40	52.7
12 VIRGINIA	27	25	16	17	40	49.8
13 TENNESSEE	43	41	34	39	34	48.0
14 WASHINGTON	8	8	8	8	8	44.3
15 WEST VIRGINIA	20	15	13	13	14	44.1
16 MISSISSIPPI	29	25	24	25	25	40.1
17 MICHIGAN	25	20	30	32	38	40.0
18 OREGON	8	7	6	7	6	36.6
19 ARKANSAS	30	27	21	19	19	35.2
20 GEORGIA	35	31	30	30	31	28.4
21 NEW YORK	4	4	5	8	5	14.9
22 MASS.	3	3	3	3	3	10.7
23 MISSOURI	11	10	9	8	5	9.5
24 FLORIDA	2	3	2	2	3	8.4
25 MONTANA	4	4	4	4	3	8.1
26 OKLAHOMA	9	—	—	1	2	7.0
27 TEXAS	9	8	8	7	9	6.1
28 KANSAS	10	6	4	3	3	5.7
29 MAINE	6	5	5	5	2	5.5
30 UTAH	2	2	2	2	1	4.7
31 MINNESOTA	1	1	1	1	1	3.7
32 IOWA	3	3	1	1	1	1.6
33 CONNECTICUT	1	2	2	2	—	0.0
34 ILLINOIS	1	1	1	1	—	0.0
35 PENNSYLVANIA	3	3	3	—	—	0.0
36 S. DAKOTA	1	1	1	—	—	0.0
37 IDAHO	1	1	—	—	—	0.0
38 COLORADO	1	—	—	—	—	0.0
TOTALS	616	581	530	541	612	28.7

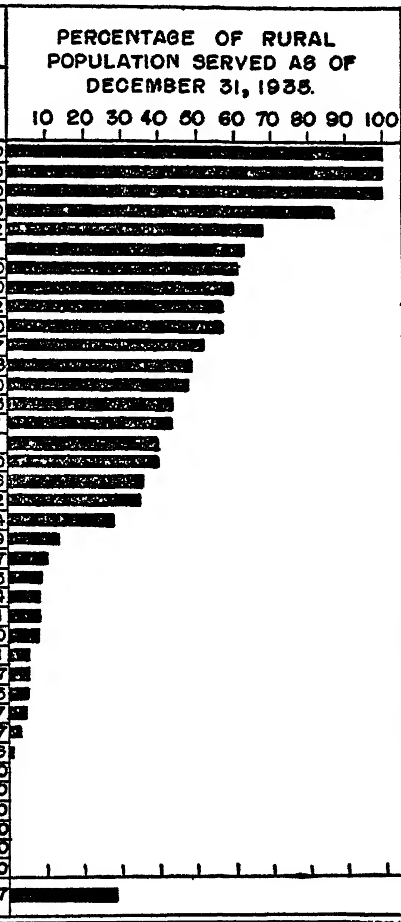

FIGURE 2.—Number of whole-time county or local district health units, by States, 1932-35, and percentage of rural population served on December 31, 1935.

It will be noted that 71.3 percent of our rural population is as yet not provided with the form of health organization which is believed to be adapted to rural areas.

DEATHS DURING WEEK ENDED JULY 25, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 25, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,841	7,291
Deaths per 1,000 population, annual basis	11.0	10.2
Deaths under 1 year of age	557	480
Deaths under 1 year of age per 1,000 estimated live births	50	44
Deaths per 1,000 population, annual basis, first 30 weeks of year	12.9	11.9
Data from industrial insurance companies:		
Policies in force	68,651,544	67,942,296
Number of death claims	13,710	12,671
Death claims per 1,000 policies in force, annual rate	10.4	9.7
Death claims per 1,000 policies, first 30 weeks of year, annual rate	10.4	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Aug. 1, 1936, and Aug. 3, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 1, 1936, and Aug. 3, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 1, 1936	Week ended Aug 3, 1935	Week ended Aug. 1, 1936	Week ended Aug 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug 3, 1935
New England States:								
Maine	1	1			40	51	0	0
New Hampshire					12	1	0	0
Vermont					7	20	0	0
Massachusetts	9	10			118	65	3	3
Rhode Island		2			7	22	0	1
Connecticut	1	2		1	14	35	0	1
Middle Atlantic States:								
New York	29	22	[1] 1	[1] 1	261	395	10	12
New Jersey	3	12	2	1	74	102	3	4
Pennsylvania [2]	10	18			89	132	3	4
East North Central States:								
Ohio	25	16	11	3	121	79	9	4
Indiana	11	14	5	17	2	10	1	3
Illinois	22	31	7	5	12	89	5	10
Michigan	12	6		2	22	199	1	1
Wisconsin	1	2	1	23	32	440	0	1
West North Central States:								
Minnesota	3	1	2	2	20	18	2	2
Iowa		2		2	4	8	1	1
Missouri	6	11	18	27	5	30	1	4
North Dakota	4	3	2		3	2	0	0
South Dakota	1	1				5	0	0
Nebraska	5	1			2	21	1	0
Kansas	4	5		2	3	16	0	3
South Atlantic States:								
Delaware		1				8	0	0
Maryland [2] [3]	4	1		1	33	16	1	3
District of Columbia	5	8			20	3	1	5
Virginia [2]		12			16	21	6	2
West Virginia	3	8	4	42	4	11	0	2
North Carolina [2] [4]	9	15			2	4	2	3
South Carolina	3	3	29	45	6	3	1	1
Georgia [4]	11	6					3	0
Florida [4]	7	4	1		2		1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 1, 1936, and Aug. 3, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935
East South Central States:								
Kentucky [2]	3	3	1		2	23	1	1
Tennessee	6	10	2	4	10	13	2	1
Alabama [4]	9	13	1	2	3	1	1	0
Mississippi [3]	5	10					0	1
West South Central States:								
Arkansas	1	7	4	5		9	0	2
Louisiana [4]	11	17	13	18	4	4	0	1
Oklahoma [5]	6	8	5	10	3		0	1
Texas [4]	16	31	24	14	18	19	1	0
Mountain States:								
Montana	1	4			1	17	0	0
Idaho			1		7		0	0
Wyoming [2]					3	7	0	0
Colorado	4	9			5	104	1	0
New Mexico	3	1	1		6		0	0
Arizona	2	1	5	1	21	1	0	0
Utah [3]					12		0	0
Pacific States:								
Washington	1				22	27	0	1
Oregon		2	2	11	5	47	0	2
California	12	14	11	9	91	148	5	1
Total	209	348	153	248	1,144	2,226	66	81
First 31 weeks of year	14,542	17,317	141,313	103,499	268,586	693,097	5,832	4,027

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935
New England States:								
Maine	2	2	17	3	0	0	3	4
New Hampshire	1	0		2	0	0	0	0
Vermont	1	0	2	5	0	0	1	0
Massachusetts	1	47	55	35	0	0	4	5
Rhode Island	0	7	2	3	0	0	0	0
Connecticut	0	10	9	8	0	0	0	0
Middle Atlantic States:								
New York	6	104	101	78	0	0	19	11
New Jersey	0	7	26	14	0	0	9	2
Pennsylvania [2]	1	2	72	75	0	0	25	13
East North Central States:								
Ohio	1	1	75	54	1	0	13	31
Indiana	0	0	19	14	0	0	6	25
Illinois	12	10	117	95	12	0	19	52
Michigan	3	10	79	56	0	0	11	19
Wisconsin	0	0	78	87	11	6	3	0
West North Central States:								
Minnesota	4	1	28	34	2	1	0	27
Iowa	0	0	29	14	0	3	1	2
Missouri	2	2	23	16	1	0	20	34
North Dakota	3	0	2	4	9	0	0	2
South Dakota	1	0	4	5	4	6	1	0
Nebraska	3	0	16	4	2	3	0	1
Kansas	0	0	36	23	0	0	8	20
South Atlantic States:								
Delaware	0	0		1	0	0	0	2
Maryland [2] [3]	0	10	15	13	0	0	11	14
District of Columbia	0	7	1	4	0	0	1	3
Virginia [2]	3	100	4	14	0	0	10	38
West Virginia	0	0	12	18	1	0	10	31
North Carolina [2] [4]	2	40	7	20	0	0	23	40
South Carolina	0	1	2	1	0	0	13	31
Georgia [4]	6	1	8	4	0	0	46	36
Florida [4]	0	0	3		0	0	2	21

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 1, 1936, and Aug. 3, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935	Week ended Aug 1, 1936	Week ended Aug 3, 1935	Week ended Aug. 1, 1936	Week ended Aug. 3, 1935
East South Central States:								
Kentucky [2]	3	18	5	16	0	0	32	55
Tennessee	26	10	13	16	0	0	32	55
Alabama [4]	29	1	4	9	0	0	15	12
Mississippi [3]	5	1	2	5	0	0	19	18
West South Central States:								
Arkansas	0	1	4	8	0	0	18	42
Louisiana [4]	0	2	2	7	0	0	27	24
Oklahoma [5]	0	0	5	8	0	0	14	44
Texas [4]	1	3	21	17	0	0	34	70
Mountain States:								
Montana	1	0	4	2	20	2	3	2
Idaho	1	0	1	2	1	3	1	0
Wyoming [2]	0	0	9	5	2	2	1	1
Colorado	6	1	7	22	1	0	4	4
New Mexico	0	0	8	3	0	0	7	14
Arizona	0	0	5	2	0	0	5	4
Utah [3]	0	0	8	9	0	0	2	0
Pacific States:								
Washington	1	0	8	10	0	6	1	2
Oregon	1	0	6	10	1	2	4	1
California	16	19	84	50	3	2	16	10
Total	142	418	1,038	905	71	36	494	822
First 31 weeks of year	1,082	2,315	181,957	178,553	6,178	5,257	5,699	7,786

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Aug. 1, 1936, 20 cases, as follows: Pennsylvania, 1; Maryland, 4; Virginia, 7; North Carolina, 5; Kentucky, 1; Wyoming, 2.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended Aug. 1, 1936, 76 cases, as follows: North Carolina, 1; Georgia, 38; Florida, 6; Alabama, 13; Louisiana, 1; Texas, 17
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1936										
Puerto Rico		50	3,169	584	173	1	0		0	51
June 1936										
Hawaii Territory	2	6	151		5		4	1	0	4
Montana	3	3	40		25		0	139	101	6
Tennessee	11	21	63	221	50	52	0	47	2	51
West Virginia	16	19	43		162		2	61	1	16
Wisconsin	3	5	41	1	609		0	1,012	24	9

Summary of monthly reports from States—Continued

May 1936	Cases
Puerto Rico:	
Chickenpox	13
Dysentery	45
Filariasis	2
Mumps	21
Ophthalmia neonatorum	6
Puerperal fever	6
Tetanus	12
Tetanus, infantile	5
Trachoma	3
Whooping cough	45
June 1936	
Chickenpox:	
Hawaii Territory	55
Montana	98
Tennessee	32
West Virginia	74
Wisconsin	1,207
Dysentery:	
Hawaii Territory (amoebic)	4
Montana (amoebic)	1
Tennessee	49
Epidemic encephalitis:	
Tennessee	1
Wisconsin	1

June 1936—Continued	Cases
German measles:	
Tennessee	32
Wisconsin	61
Hookworm disease:	
Tennessee	2
Impetigo contagiosa:	
Tennessee	2
Leprosy:	
Hawaii Territory	5
Mumps:	
Hawaii Territory	36
Montana	137
Tennessee	72
West Virginia	37
Wisconsin	996
Ophthalmia neonatorum:	
Tennessee	4
Wisconsin	1
Puerperal septicemia:	
Tennessee	1
Rocky Mountain spotted fever:	
Montana	10
Scabies:	
Tennessee	2
Septic sore throat:	
Hawaii Territory	2
Montana	8
Tennessee	5

June 1936—Continued	Cases
Tetanus:	
Montana	1
Tennessee	5
Trachoma:	
Tennessee	61
Wisconsin	1
Tularaemia:	
Tennessee	1
Wisconsin	3
Typhus fever:	
Hawaii Territory	1
Tennessee	2
Undulant fever:	
Montana	1
Tennessee	2
Wisconsin	6
Vincent's infection:	
Montana	1
Tennessee	4
Whooping cough:	
Hawaii Territory	34
Montana	89
Tennessee	94
West Virginia	88
Wisconsin	561

RODENT PLAGUE IN CALIFORNIA AND UTAH

One ground squirrel found dead July 16, 1936, in Beaver Canyon, 5 miles east of Beaver, Utah, has been proved positive for plague by animal inoculation and cultural reactions.

The Director of Public Health of California has reported plague infection in five squirrels received at the laboratory on July 28, 1936, from a ranch 33 miles north and 13 miles west of Alturas, Modoc County; also in four squirrels received at the laboratory on July 21, 1936, from 6 miles east of Watsonville, and in two squirrels received at the laboratory on July 22, 1936, from a ranch 6 miles east of Watsonville, Santa Cruz County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 25, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	5	1	0	0	0	0	0	19
New Hampshire:											
Concord	0		0	0	1	0	0	0	0	0	8
Manchester	0		1	0	1	0	0	0	0	0	10
Nashua	0			0		0	0		0	0	
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	0
Burlington	0		0	1	0	0	0	0	0	0	8
Rutland	0		0	0	0	1	0	0	0	0	4
Massachusetts:											
Boston	4		1	37	17	9	0	9	0	60	195
Fall River	2		0	2	0	1	0	1	0	1	33
Springfield	0		0	1	0	1	0	0	0	4	29
Worcester	0		0	16	4	2	0	3	0	5	40
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	16
Providence	1	1	0	3	0	3	0	3	2	6	41
Connecticut:											
Bridgeport	1		0	8	0	1	0	0	0	9	26
Hartford	0		0	0	1	0	0	1	1	1	28
New Haven	0		0	0	0	1	0	0	0	8	34
New York:											
Buffalo	0		0	18	0	13	0	3	2	0	117
New York	22	2	1	133	50	29	0	80	9	119	1,182
Rochester	0		0	2	2	2	0	0	0	7	54
Syracuse	0		0	14	1	4	0	1	0	22	48
New Jersey:											
Camden	0		0	4	2	1	0	2	0	0	42
Newark	0		0	17	1	3	0	4	1	27	74
Trenton	0		0	2	1	0	0	4	0	8	49
Pennsylvania:											
Philadelphia	3	1	0	38	16	11	0	18	2	65	424
Pittsburgh	2	1	1	2	25	22	0	3	1	42	154
Reading	0		0	3	0	0	0	2	1	5	24
Scranton	1	0		0		1	0		0	0	
Ohio:											
Cincinnati	4		0	10	6	7	0	10	1	5	156
Cleveland	6	3	1	19	7	12	1	13	1	110	159
Columbus	0		0	2	1	1	0	3	0	24	88
Toledo	0		0	4	6	0	0	3	0	40	68
Indiana:											
Anderson	0		0	0	0	3	0	1	0	5	7
Fort Wayne	0		0	0	1	2	0	0	0	0	24
Indianapolis	1		1	0	8	4	0	6	1	7	103
Muncie	0		0	0	0	1	0	2	0	0	10
South Bend	0		0	0	0	0	0	1	0	2	17
Terre Haute	0		0	0	0	0	0	0	0	0	23
Illinois:											
Alton	0		0	0	0	1	0	0	3	3	9
Chicago	5		0	6	34	39	2	30	1	113	634
Elgin	0		0	0	1	0	0	1	0	2	6
Moline	0		0	0	1	0	0	0	0	0	8
Springfield	0		0	0	1	1	0	0	0	14	18
Michigan:											
Detroit	5		0	5	7	34	0	20	5	176	220
Flint	0		0	1	1	4	0	2	0	2	22
Grand Rapids	0		0	2	1	3	0	0	2	14	3
Wisconsin:											
Kenosha	0		0	0	0	1	8	0	0	3	7
Madison	0		0	3	0	2	0	0	1	29	14
Milwaukee	0		0	6	7	22	1	7	0	45	110
Racine	0		0	0	2	3	0	1	0	0	12
Superior	0		0	0	0	2	0	0	0	0	8
Minnesota:											
Duluth	0		0	0	1	7	0	2	0	12	21
Minneapolis	0		0	2	3	3	0	2	0	4	130
St. Paul											

City reports for week ended July 25, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0			0		0	0		0	1	
Des Moines	1			0		0	0		0	0	34
Sioux City											
Waterloo											
Missouri:											
Kansas City	1		0	2	2	6	0	3	0	1	106
St. Joseph											
St. Louis	0		0	4	8	0	0	7	2	17	402
North Dakota:											
Fargo	0		0	0	0	1	0	0	0	3	13
Grand Forks	0			1		0	0		0	0	
Minot	0			1		1	0		0	0	4
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Nebraska:											
Omaha	3		0	1	4	1	0	9	0	0	110
Kansas:											
Lawrence	0			0		0	0		0	0	9
Topeka											
Wichita	0		0	0	3	0	0	0	0	1	52
Delaware:											
Wilmington	0		0	1	3	0	0	1	0	4	27
Maryland:											
Baltimore	3	1	0	53	14	6	0	14	0	95	182
Cumberland	0		0	0	0	0	0	0	0	0	10
Frederick	0		0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	2	1	0	38	8	5	0	14	2	33	145
Virginia:											
Lynchburg	1	0		0	0	0	0	0	1	1	4
Richmond	0		0	0	1	0	0	1	1	5	41
Roanoke	0		0	1	0	1	0	0	0	0	8
West Virginia:											
Charleston	0		0	0	0	0	0	0	0	0	18
Huntington	0		0	0		1	0	1	1	0	
Wheeling	0		0	1	2	0	0	1	0	4	13
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh	0		0	0	2	0	0	2	0	0	19
Wilmington	0		0	0	0	0	0	1	0	2	8
Winston-Salem	0		0	0	1	0	0	2	0	0	21
South Carolina:											
Charleston	0		0	0	0	0	0	3	1	0	19
Columbia											
Florence	0		0	0	0	0	0	0	0	0	8
Greenville	2		0	1	2	0	0	0	0	0	6
Georgia:											
Atlanta	1	1	0	1	3	0	0	5	1	0	71
Brunswick	0		0	0	0	0	0	0	0	0	4
Savannah	3		0	0	0	0	0	2	0	0	33
Florida:											
Miami	0	1	0	0	0	1	0	2	0	4	24
Tampa	0		0	0	1	0	0	1	0	0	20
Kentucky:											
Ashland	0		0	1	0	0	0	0	3	0	0
Covington	0		0	2	0	1	0	1	0	0	19
Lexington	0		0	0	1	0	0	1	0	0	18
Louisville	1		0	0	3	5	0	4	0	1	77
Tennessee:											
Knoxville	0		1	0	2	1	0	1	0	0	38
Memphis	2		0	0	4	0	0	11	0	13	82
Nashville	1		0	0	6	0	0	1	3	0	49
Alabama:											
Birmingham	1		0	0	5	0	0	3	0	0	62
Mobile	0		0	0	1	1	0	0	0	0	13
Montgomery	0			0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		0	0	
Little Rock	0		0	0	2	0	0	2	0	0	4
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	6
New Orleans	4	1	0	4	6	2	0	15	3	17	152
Shreveport	1		0	0	3	0	0	1	0	0	51
Oklahoma:											
Tulsa	0			0		0	0		0	0	

City reports for week ended July 25, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas:											
Dallas	4	1	1	2	3	3	0	2	1	0	85
Fort Worth	0	------	0	5	1	0	0	0	0	4	41
Galveston	0	------	0	0	1	1	0	2	0	0	16
Houston	1	------	0	0	5	2	0	4	6	0	66
San Antonio	0	------	0	1	1	0	0	5	0	0	49
Montana:											
Billings	0	------	0	0	0	1	0	0	0	1	5
Great Falls	0	------	0	0	0	0	0	0	0	1	5
Helena	0	------	0	1	0	1	0	0	0	0	4
Missoula	0	------	0	0	1	0	0	0	0	0	13
Idaho:											
Boise	0	------	0	0	0	0	0	0	0	0	8
Colorado:											
Colorado Springs	0	------	0	0	0	2	0	1	0	0	5
Denver	1	------	0	1	2	3	0	3	2	43	84
Pueblo	0	------	0	0	1	1	0	0	0	0	11
New Mexico:											
Albuquerque	0	------	0	5	0	1	0	3	0	4	16
Utah:											
Salt Lake City	0	------	0	4	2	4	0	0	0	5	23
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	1	16	0	0	0	4	0	4	80
Spokane	0	------	0	2	1	2	1	0	0	14	27
Tacoma	0	------	0	1	0	0	0	1	1	0	29
Oregon:											
Portland	0	------	0	0	1	4	0	2	3	4	77
Salem	0	------	------	1	------	2	0	------	0	2	------
California:											
Los Angeles	14	5	0	24	10	7	0	21	2	65	331
Sacramento	0	------	0	0	1	6	0	4	0	20	26
San Francisco	1	------	0	13	5	8	0	7	0	3	141

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases	State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:				**Georgia:**			
Boston	1	3	0	Savannah	0	0	1
New York:				**Florida:**			
New York	6	4	2	Miami	1	0	0
Syracuse	0	0	1	**Kentucky:**			
Pennsylvania:				Louisville	2	2	0
Philadelphia	2	1	0	**Tennessee:**			
Ohio:				Knoxville	0	0	2
Cincinnati	0	0	1	Nashville	0	0	2
Indiana:				**Alabama:**			
Indianapolis	1	0	0	Birmingham	0	0	5
Illinois:				**Louisiana:**			
Chicago	2	2	2	New Orleans	0	1	0
Springfield	0	1	0	Shreveport	0	2	0
Michigan:				**Oklahoma:**			
Detroit	0	0	2	Tulsa	1	0	0
Missouri:				**Texas:**			
St. Louis	1	0	2	Houston	0	0	1
Maryland:				**Washington:**			
Baltimore	5	0	0	Seattle	1	0	0
Dist. of Columbia:				**Oregon:**			
Washington	1	0	0	Portland	0	0	1
South Carolina:				**California:**			
Greenville	1	0	0	Los Angeles	4	2	9
				San Francisco	1	0	0

Epidemic encephalitis.—Cases: New York, 2; Philadelphia, 2; Cleveland, 1; St. Louis, 1.

Pellagra.—Cases: Charleston, S. C., 1; Savannah, 6; Miami, 2; Birmingham, 1; Mobile, 1; New Orleans 1; Los Angeles, 1; San Francisco, 2.

Rabies (human).—Deaths; Chicago, 1.

Typhus fever.—Cases. Savannah, 5.

FOREIGN AND INSULAR

ITALY

Communicable diseases—4 weeks ended May 24, 1936.—During the 4 weeks ended May 24, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	Apr. 27–May 3		May 4–10		May 11–17		May 18–24	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	10	10	9	9	13	12	15	14
Cerebrospinal meningitis	20	17	24	22	18	17	23	19
Chicken pox	346	133	394	160	380	153	402	153
Diphtheria and croup	384	209	378	208	363	210	383	227
Dysentery	3	3	5	5	10	5	4	4
Hookworm disease	17	8	10	7	19	7	20	11
Lethargic encephalitis	5	5	4	4	3	3	3	2
Measles	1,749	343	2,161	349	2,513	374	2,379	364
Mumps	280	117	346	90	334	104	351	126
Paratyphoid fever	37	30	38	26	43	35	26	20
Poliomyelitis	29	24	30	21	46	34	36	27
Puerperal fever	28	26	28	28	29	27	18	18
Rabies					1	1		
Scarlet fever	237	117	253	125	254	120	303	126
Typhoid fever	224	140	251	150	273	161	280	150
Undulant fever	95	67	92	70	100	66	109	79
Whooping cough	723	195	1,030	210	690	174	624	171

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for July 31, 1936, pages 1053–1067. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued August 28, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India.—Cholera has been reported in India as follows: During the week ended June 27, 1936, eight cases were reported at Karikal Territory, and on July 29, 1936, three cases were reported at Sind State, India.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—One rat found July 22, 1936, and one found July 27, 1936, both in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

United States.—A report of rodent plague in California and Utah appears on page 1138 of this issue of PUBLIC HEALTH REPORTS.

Typhus Fever

Irish Free State—Galway County—Oughterard—Poulywerrin.—During the week ended July 18, 1936, one case of typhus fever was reported at Poulywerrin, Oughterard, Galway County, Irish Free State.

Yellow Fever

Bolivia—La Paz Department—Suapi.—During the month of June 1936, two cases of yellow fever were reported at Suapi, La Paz Department, Bolivia.

Brazil—Sao Paulo State—Guayra.—On June 26, 1936, one fatal case of yellow fever was reported at Guayra, Sao Paulo State, Brazil.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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AN ESTIMATE OF THE MONETARY VALUE TO INDUSTRY OF PLANT MEDICAL AND SAFETY SERVICES

By DEAN K. BRUNDAGE, *Senior Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

In an article on sickness among employees from an employer's viewpoint, Edward A. Filene[1] shows the importance of finding out how much sickness there is in an organization, and then deciding what can be done about it. If an organization does more than it can afford to do for its employees, he points out, some other organization which does not do so much will undersell it, and presently there will be no business and no resources with which to do anything. It is therefore necessary for a company to confine itself to some course which will be good for the business and by which it can continue to prosper. He states also that a lot of life-saving is involved in a matter-of-fact approach to health and accident problems in industry. The most notable advances were made in the safety movement, he states, not by humanitarian agitation, but by the business discovery that safety devices were cheaper in the long run than accidents.

In an endeavor to ascertain how much money an industrial organization can afford to spend for the prevention of disability from sickness and accidents and for the treatment of minor illnesses and injuries among its employees, the trend in occupational accident rates in this country during recent years was reviewed as well as the rates of disabling sickness among the employees of a few corporations which maintain morbidity records. An important item in calculating profitable expenditure for health and accident protection is the extent of reduction in disability frequency and time-lost rates which may be achieved through medical and engineering control of industrial health and accident problems.

TREND OF INDUSTRIAL ACCIDENT RATES

In the iron and steel industry a steady decrease has occurred in the frequency of occupational accidents during the 26 years for which the record is available (1907–32).[2]

Five-year moving averages show no increases in frequency throughout this period. The average rate for the 5 years 1907–11 was 69.2 accidents per million hours' exposure; during the 5 years 1928–32 the average rate was 21.1, a decrease of 70 percent. During this

[1] Filene, Edward A.: How I got that way. The Survey Graphic, Vol. 23, No. 12, December 1934.

[2] Accident experience in the iron and steel industry to the end of 1932. Monthly Labor Review, Bureau of Labor Statistics, U. S. Department of Labor, Vol. 37, No 3, September 1933.

period the accident severity rate (time loss) was reduced by more than 50 percent. That accident frequency in the steel industry has not yet reached stabilization approaching irreducible minimum rates is indicated by the fact that the rate of decrease in recent years has not become markedly less than in the earliest years of record, i. e., 20 to 25 years ago. For the 5 years 1928–32 the frequency rate of accidents in the steel industry was 16.0 percent below the rate for the period 1924 to 1928. For 1911 to 1915 the rate was 20.8 percent below that for 1907–11, although the general level of accident frequency was about three times as great during the period 1907–15 as in recent years.

That irreducible rates have not yet been reached is further substantiated by the finding that the frequency of accidents was only 8.1 per million hours' exposure in 1932 in a group of companies in the industry which followed the best practices in efforts to reduce occupational injuries, as against 18.1 accidents per million hours' exposure for the industry as a whole.

Similar results are shown by other industrial accident statistics, especially those published by the National Safety Council, but the experience of the steel industry suffices for a brief review of accomplishment in accident prevention and for indications that the rates may be reduced still further.

SAVINGS TO THE EMPLOYER FROM REDUCTION IN ACCIDENTS

The answer to the question concerning the sum an employer can afford to spend for more intensive safety work depends to a considerable extent on the number of accidents which would be prevented by an enlarged industrial safety program. In 1931, after years of intensive accident-prevention work, industrial injuries among employees of the Edison Electric Illuminating Co., of Boston, occurred at the rate of 16.3 cases causing disability for 1 full day or longer per 1,000 employees. Two years later (1933) the rate was 14.1, a decrease of 13.5 percent. Obviously this is an isolated example, but it checks so well with the accident experience in the steel industry and with the results in other industries that a reduction of 10 to 15 percent within a 2- or 3-year period seems to be an attainable goal for a safety organization competently manned. For the purpose of computing savings to the employer, a reduction of 12½ percent in the frequency of compensable accidents will be assumed. The computations are based on compensable accidents, because their cost has been more accurately ascertained than that of noncompensable accidents. A decrease in the frequency of compensable injuries may be expected when the frequency of *all* occupational accidents causing disability for 1 day or longer is appreciably reduced.[3]

[3] *Cf* Trend of disabling sickness among employees of a public utility Reprint No 1239 from the Public Health Reports of July 27, 1928, table 6

The cost of industrial accidents has been studied in considerable detail by engineers of the Travelers Insurance Co. They estimated that the indirect or hidden cost of industrial accidents averages about *four times* the cost of compensation and medical services.[4] In other words, compensation and medical payments constitute only one-fifth of the total employer accident cost. This estimate is based upon research covering approximately 10,000 cases taken at random from claim files. Heinrich[5] states that its accuracy has been demonstrated by application to scores of specific plants.

From data available at the United States Bureau of Labor Statistics, it is estimated that the total amount of compensation paid to injured workers is about $240,000,000 per year An additional $72,000,000 is paid for hospital treatment and medical aid. This constitutes a total of $312,000,000, incurred on account of approximately 2,107,000 injuries among an estimated 20,000,000 workers.[6] From these data the average direct cost under compensation is estimated to be about $148 per compensable injury. To this sum, Heinrich states, there should be added certain legal and administrative costs, including such items as services of claim investigators, taxes and other overhead expense, and miscellaneous incidentals. These costs are usually included in the compensation-insurance premium paid by the employer to his insurance carrier. In industrial concerns which are self-insurers, similar costs must be met, as such companies are obliged to set up clerical procedure, employ legal talent, make their own investigations, and disburse compensation payments. The total direct cost of the average compensable injury is thus increased to $246. This sum, however, was found to represent only one-fifth of the cost to the employer.[7] Total cost to the employer is estimated at $1,230 per compensable injury. When this figure is multiplied by the estimated annual total of 2,107,000 com-

[4] Heinrich, H. W.: Cost of industrial accidents to the State, the employer, and the man. Monthly Labor Review, Bureau of Labor Statistics, U. S. Department of Labor, vol. 31, no. 5, November 1930.

[5] Ibid., p. 73.

[6] For the number of persons covered by workmen's compensation laws, no reliable estimate is available. The 20,000,000 quoted above is probably an overstatement, which would underestimate rather than overestimate the employer's cost per 1,000 workers.

[7] The indirect or hidden costs to the employer studied by the Travelers Insurance Co. included such factors as cost of lost time of injured employee; cost of time lost by other employees who stopped work out of curiosity, out of sympathy, to assist the injured employee, or for other reasons; cost of time lost by foremen, supervisors, or other executives to assist injured employee, to investigate the cause of the accident, making arrangements for a substitute to take the place of the injured employee; selecting, training, or breaking in a new employee to replace the injured worker; preparing State accident reports, or attending hearings before industrial commissioners; cost of time spent on the case by first-aid attendant and hospital department staff when this time is not compensated by insurance; cost due to injury to the machine, tools, or other property, or to the spoilage of material; cost due to interference with production, failure to fill orders on time, loss of bonuses, payment of forfeits, and other similar causes; cost under employee welfare and benefit systems; cost in continuing the wages of the injured employee in full, after his return, even though the services of the employee who is not fully recovered may for a time be worth only about half of their normal value; cost due to the loss of profit on the injured employee's productivity and on idle machines; cost of subsequent injuries that occur in consequence of the excitement or weakened morale due to the original accident; overhead cost—the expense of light, heat, rent, and certain other items—which continues while the injured employee is a nonproducer.

pensable injuries, the cost is found to exceed 2½ billion dollars per year. On the assumption that there are 20 million persons in the United States covered by workmen's compensation laws, the cost of compensable accidents to the employer thus becomes approximately $125,000 per year per 1,000 employees on the pay roll. A 12½ percent reduction in the frequency of these injuries would represent an annual saving to the employer of about $15,600 per 1,000 persons on the pay roll.

This figure is applicable, however, only to those establishments having an accident rate which is about the same as the average for all industries functioning under workmens' compensation. What estimate should be used for the many establishments having an accident experience more favorable than this average? For such establishments as a group it seems reasonable to assume a reduction of one-half as much as for the plants included in the data of the Bureau of Labor Statistics previously quoted. This would mean a decrease of six to seven compensable accidents a year per 1,000 employees. Basing the computation on a reduction of seven compensable accidents a year per 1,000 workers, one finds that the saving to the employer at $1,230 per compensable injury is about $8,600 annually per 1,000 on the pay roll. If the rate of compensable accidents is already so low that a further reduction of seven per year per 1,000 employees appears overoptimistic, the equivalent of the $8,600 saving mentioned above might be obtained by the prevention of four compensable accidents, for example, at a cost reduction of $4,900, with the remaining $3,700 saved by the prevention of a relatively small number of noncompensable injuries and no-injury accidents which destroy raw material or damage tools and machinery. In any event, the estimated cost reduction of $8,600 annually per 1,000 workers appears as a reasonable credit to place against the debit for services and equipment necessary for greater control of occupational accident hazards.

In the example cited, the savings indicated are not predicated on a reduction in the rate each year; instead, it is merely assumed that the specified decrease in accident frequency would be made within a 2- or 3-year period, and that the lower rate would be maintained thereafter. It is the general experience, however, that well-organized safety work has resulted in almost continuously declining accident rates, exemplified in the 5-year moving averages mentioned in the comment on accident frequency in the iron and steel industry. Such a trend obviously would increase materially the savings estimated above.

TREND IN SICKNESS TIME-LOST RATES

The records of time lost on account of sickness and nonindustrial injuries show no such spectacular decreases as those achieved in the industrial accident field. The sickness problem obviously is more

difficult on account of the many nonindustrial factors involved. Nevertheless, among the employees of certain companies the trend in sickness time-lost rates has been definitely downward in recent years. Three-year moving averages of the annual number of days of disability from sickness and nonindustrial accidents per man on the factory pay roll of a large rubber company in New England show no increases in the rate (with one very minor exception) during the decade ending December 31, 1930. Also among the women on the factory pay roll of this company the time lost from work on account of sickness decreased during the same period, although there was greater irregularity in the downward movement of their rates. In a public utility in Massachusetts employing about 3,000 persons there has been no appreciable decrease in sickness time-lost rates since the company's medical department was established in 1913, but the mortality rate has declined more rapidly than among persons at the same ages in the general population of the State. Comparing the mortality in 1925–29 with 1913–24, one finds that the rate of death among male employees of the company between the ages of 15 and 65 decreased approximately 14 percent more than among males at these ages in the State at large. If the period 1925–29 is compared with the 5 preceding years, i. e., 1920–24, it is found that the decrease in the death rate among males on the company's pay roll exceeded that in Massachusetts as a whole by about 22 percent. In another public utility farther south on the Atlantic seaboard, the number of calendar days of disability from sickness and nonindustrial accidents averaged 5.19 days per year per person during the 2 years ending December 31, 1931; during the 2 years ending December 31, 1934, the annual rate was 4.55, or a decrease of 0.64 day per year per person on the pay roll.

From these results it appears that a decrease of at least two-thirds of a day of disability per annum per person on the pay roll or the equivalent of such a saving through reduced mortality may be obtained within a few years by competent industrial medical service.

An essential requirement for such accomplishment is a personnel trained and experienced in dealing effectively with health problems; no permanent betterment in morbidity and mortality rates can be anticipated if little thought or time is devoted to the preventive aspects of industrial medicine.

Fortunately, the sickness time-lost rate may be reduced without preventing a single case of illness. A number of companies attack the problem by attempting, first, to get an accurate diagnosis of an employee's illness, and then see to it that the most appropriate treatment is instituted as soon as possible. Opportunities for reducing the duration of illness have been found to be plentiful, especially among those workers who do not know the most capable physicians in the

different specialties, or among those who drift into the hands of charlatans and quacks, or who believe in patent-medicine panaceas, or pursue worthless self-medication. Another important saving in time results from the removal of the economic barrier between patient and physician. An employee usually feels that he cannot afford to consult a physician every time he has (or what appears to him as) a minor illness. When he can consult a doctor without having to pay for each visit, an employee is more likely to seek medical advice before an actual break-down takes place, thus avoiding a long lay-off that would be necessary if he had delayed until the disease had got out of hand. If consulted in time, a physician may be able to prevent an extended illness and premature death, especially if the disease is of slow development, as, for example, tuberculosis, cancer, or silicosis; if he is not consulted in time, the physician may follow the best medical procedure known and still be unable to restore the patient to health. Such cases are cited merely to illustrate the point that economic losses due to disease may be reduced even though illnesses may not actually be prevented; other opportunities of this sort will readily occur to those engaged in industrial medical work.

It is not the intention to imply that plant medical or safety services are profitable only when disability rates can be reduced. The total cost of a plant medical department may be less than the professional value of the medical service which a company is obligated to render by law or for its protection under the compensation laws. As an example, the cost of treatments given by the medical staff of an oil company for industrial injuries occurring among approximately 8,000 men employed in its refineries in one community was found to be considerably less than the cost of such services based on the average medical fees in the community. When two medical activities were considered on this basis, i. e., the treatment of industrial injuries and the physical examination of applicants for employment, a saving of 60 percent was indicated.[8]

SAVINGS TO THE EMPLOYER FROM REDUCTION IN SICKNESS

It is unfortunate that we do not know the cost to the employer of sickness and ill health among his employees. Insofar as the writer is aware, no detailed study has been made of the indirect or hidden costs of sickness and nonindustrial accidents. Some of the factors which have been included in the study of industrial accidents obviously apply also to sickness. In many instances the loss due to illness may be greater than that from industrial injuries, because the amount of absence from work occasioned by sickness is usually much more than the absenteeism caused by industrial accidents, especially

[8] Schoenleber, A. W.: How industrial medicine aids in management. Personnel Journal, vol. 14, nos. 7 and 8, January-February 1936, p 298.

among women, whose lost time from sickness in certain companies has been found to be as much as 40 times the number of days lost from work on account of industrial accidents.

Among the items in the bill for sickness and nonindustrial injuries are the cost of time lost by other employees who stop work to assist or care for disabled fellow workers; time of foremen and supervisors in making arrangements for substitutes; selecting, training, or breaking in new workers to replace the incapacitated; cost of interference with production, failure to fill orders on time, loss of bonuses, or payment of forfeits; cost of continuing the wages of sick employees in full both before and after the period of disability, for their services may be worth only a part of their normal value when they are coming down with disease (if it is not characterized by sudden onset), or return to work when not yet fully recovered. Almost all industrial processes are probably slowed up at one time or another by the illnesses of managers, key men, or skilled workers. Also, a correlation has been found between the incidence of accidents and the physical condition of the worker. Persons in ill health appear to be prone to accident, as shown by the finding that those who have the most accidents are, on the whole, those who pay the most visits to the medical department for minor illnesses.[9]

In the absence of a detailed study of these costs, reliable estimates obviously cannot be presented. It may be assumed, however, that the cost to the employer is at least 1½ times the amount of the daily wage when experienced employees are incapacitated by sickness. If the average wage is $4 per day, a reduction in the annual sickness time-lost rate of two-thirds of a day per employee would save the employer $4,000 per year per 1,000 persons on the pay roll. Even with no decrease in the sickness time-lost rate, this amount could be saved by the prevention of premature mortality.[10]

This figure grossly underestimates potential savings achievable through health maintenance of key men, and the increased efficiency of the rank and file due to better health; but until the costs of illness are ascertained in more detail, this figure may suffice for calculating minimum expected savings.

Thus from a modest reduction of sickness and accident rates the savings to the employer may be expected to be at least $12,600 per annum per 1,000 employees. It appears, therefore, that an employer can afford to spend at least $12,000 per year per 1,000 employees for preventing accidents and conserving health when his industrial

[9] Newbold, E. M.: A contribution to the study of the human factor in the causation of accidents. Industrial Fatigue Research Board, Medical Research Council, Report No. 34. His Majesty's Stationery Office, London, 1926, p. 61.

[10] As an example of the value of industrial medical service in preventing premature mortality, an official of a corporation in New England stated verbally to the writer that his company's medical department had more than earned its entire cost over a period of several years by capable management of one emergency in which the life of an exceptionally able and experienced executive was saved.

accident rate is considerably below the average for industries covered by workmen's compensation law, and when there are a negligible number of illnesses among his workmen attributable to occupational health hazards. When industrial accidents or disabling illnesses occur at average or above average frequency, an expenditure larger than that indicated above for health and safety work obviously is warranted.

ADDITIONAL SAVINGS IN ESTABLISHMENTS HAVING HEALTH HAZARDS OF OCCUPATIONAL ORIGIN

In addition to the minimum savings previously estimated, engineering and medical services may decrease operating costs through control or elimination of hazards to health due to the nature of the work or the working environment. The money value of such work may be ascertained for different establishments in accordance with the problems confronting them. In the States which have adopted legal measures providing for compensation for occupational diseases as well as for industrial injuries, the cost of the compensation insurance premium alone, without regard to the hidden or indirect costs of occupational disease, may justify from an economic standpoint the capital required to eliminate existing health hazards. In a relatively small establishment in Massachusetts in which the workers were exposed to silica dust, the management installed an efficient system of exhaust ventilation to remove the dust at its point of origin. This procedure, which virtually eliminated the hazard, enabled the company to cease paying an annual $50,000 compensation insurance premium while expenses of only $5,000 to $10,000 per year were incurred for engineering and medical check-up and for self-insurance. In States having no compensation laws, the costs of pending and potential suits under common law must be reckoned. For silicosis alone, pending damage claims are now estimated to be several hundred million dollars.

To these costs should be added the hidden expense due to physical impairment of the workers having diseases of occupation. In a recently published study of the health of anthracite coal miners, the United States Public Health Service found, from analysis of data relative to exercise tests and the extent of pathology revealed by physical examinations, that 12 to 64 percent of the men in the groups exposed to the higher concentrations of dust showed decreased capacity for work, as compared with 10 percent of the men at approximately the same ages who were not appreciably exposed to dust.[11] Although the output of employees having decreased capacity for work due to occupational disease has not been ascertained in com-

[11] Anthraco-silicosis among hard coal miners. Public Health Bulletin No. 221, Government Printing Office, Washington, 1936. Pp. 53 and 90–92.

parison with the work performed by able-bodied men, it seems apparent that the physical impairments of occupational origin constitute an item in operating costs which could be reduced by engineering and medical control of industrial hazards.

Savings of this sort may be regarded by some as limited to a few industries having well-recognized hazards to health. Such opinion may be due in part to the fact that vital statistics have not been developed enough to afford information concerning the effect of many occupations. Those studies which have been made in this country and abroad, however, indicate that the full effect of occupation on health has not been recognized even by many physicians and health workers. Clerical work, for example, is usually considered as fairly innocuous, as evidenced by the fact that industrial physicians rarely undertake studies of the health of clerical groups; yet, as far back as 1700, Bernardini Ramazzini called attention to a special hazard among clerks from sitting all day at desks. In 1934 the National Tuberculosis Association published a study of death rates by occupation based on data of the United States Census Bureau covering 10 selected States for the year 1930 which, it is interesting to note, in view of Ramazzini's observations, revealed a standardized mortality rate of 7.40 deaths per 1,000 male clerical employees at ages 15 to 65 as compared with 6.21 deaths per 1,000 male agricultural workers.[12] The odds against this difference being due solely to chance were found on computation to be literally millions to one. Although other influences, such as the factor of selection, for example, may be involved in the higher death rate of clerical than of agricultural workers, the difference in the rates is wide enough to warrant study and appropriate action to minimize the hazards of this as well as other occupational groups too frequently considered as being outside the pale of disease-preventive work in industry.

EXTENT OF DEVELOPMENT OF INDUSTRIAL HYGIENE PROGRAMS

A considerable amount of excellent work in the field of industrial hygiene has been carried on over the past 15 or 20 years, and a number of companies have developed far-reaching programs of benefit not only to their employees but also to their employees' families and to the communities in which they live. Programs of this nature, however, serve only a small minority of the industrial population, judging from the facts revealed in a recent survey of a typical industrial area in the United States.[13] About 5 percent of the 615 plants surveyed, and approximately 20 percent of the 28,686 workers employed in

[12] Whitney, Jessamine S.: Death rates by occupation. National Tuberculosis Association, N. Y., 1934, p. 17.

[13] Bloomfield, J. J., Johnson, W. S., and Sayers, R. R.: The potential problems of industrial hygiene in a typical industrial area in the United States. Public Health Bulletin No. 216. Government Printing Office, Washington, December 1934.

these factories were provided with the services of a safety director either on a part-time or full-time basis. As indicative of benefits to be derived from safety work administered by a director, analysis of the data collected showed that the percentage of persons exposed to unguarded moving machinery was less in practically all the plants having a safety director than in those not having one. Approximately 17 percent of the workers were provided with industrial medical service on a part-time basis, and only 15 percent had the services of a full-time physician. Industrial nursing service was available to 34 percent of the employees in the area surveyed.

Although 83 percent of the employees worked without benefit of industrial medical advice and care, 39 materials and conditions potentially hazardous on account of possible systemic poisoning were revealed by the survey. Inorganic dusts, carbon monoxide, and lead compounds were found to be the most important from the standpoint of the number of persons exposed. If one may regard these findings as typical, or at least as not erring grossly, it is apparent that the possibilities for saving dollars, quite aside from the humanitarian aspects of the problem, have scarcely been touched.

AMOUNT OF EXPENDITURE WARRANTED FOR HEALTH AND ACCIDENT PROTECTION

The expenditure of $12,000 annually per 1,000 employees, estimated as warranted from an economic standpoint, may be appreciably increased when even a small percentage of the workers handle materials or are engaged in processes which may affect health adversely. The size of the extra appropriation needed for protection of the exposed workers obviously depends on the severity of the hazard. The direct and hidden costs of a single minor hazard might easily total $8,000 per year, in which event an expenditure of $20,000 per annum per 1,000 employees would be warranted for adequate health and accident protection. Or, in the absence of any industrial health hazard, an appropriation of an additional $6,000 per year per 1,000 workers could be justified on the basis of its value to employees; for, as will be shown later, effective industrial medical service saves the workers at least $6.20 per capita per year.

HOW APPROPRIATIONS FOR INDUSTRIAL HYGIENE MAY BE SPENT TO BEST ADVANTAGE BY THE PLANT

Effective work in the field of industrial hygiene requires the services of an industrial physician, a safety and a sanitary engineer either on full or part time, depending on the number of employees and the nature and severity of the accident and disease problems to be solved.

A logical first step in the development of an industrial-hygiene program is a thorough analysis of the records of disability maintained

by the sick-benefit association, if such an organization is already functioning. If not, sickness and accident records should be instituted, as the value of records in disclosing the relative importance of different hazards and in evaluating the effect of welfare activities has been demonstrated many times. Analysis of disability statistics affords knowledge of the frequency and severity of specific diseases by sex and age and according to occupation, and when these rates are compared with the average frequency and severity of different types of illness among industrial workers, published in the Public Health Reports, the nature and extent of the sickness problem in any given industrial establishment is revealed.

In addition, a study by the industrial physician and safety and sanitary engineers of all potential accident hazards and all materials and conditions of employment which may ultimately affect health deleteriously, along the lines followed in the survey of a typical industrial area to which reference was made in footnote 13, will afford information as to situations requiring more detailed study and observation. Since it is usually impossible to tell by mere inspection of workrooms whether health hazards exist, the industrial sanitary engineer must obtain quantitative measurements, especially of the concentration of dust or toxic materials present in the atmosphere. With this information, in conjunction with knowledge of the toxicity of the materials studied, he can determine the extent of the hazard. Various methods of control adaptable to local plant conditions must then be evaluated, and a remedial program instituted. After suitable protective equipment has been installed, and after illumination, sanitation, and ventilation of the plant have been brought to a high standard of efficiency, a periodic check-up is required to determine whether certain changes should be made. For this purpose medical work is as important as engineering control. Periodic physical examinations of employees and analysis of the recorded findings, as well as the disability statistics for groups having different kinds of occupational exposure such as dust, fumes, heat, humidity, and wide changes in temperature (the usual concomitants of manufacturing processes), will reveal the problems needing further attention. Amelioration of the effect of existing hazards may also be obtained by deferring to the plant physician the determination of the type of work best suited to the physical condition of the individual workers. The pre-employment examination and the periodic physical check-up with a few simple tests to determine the mental reaction to given circumstances afford a large part of the information needed for proper placement of workers.

The average cost of medical service, consisting of minimum equipment of a well-supplied dispensary and minimum personnel of a full-time trained nurse, with the service supplied only to employees of the

company, and the expenses paid wholly by the management, is reported by the National Industrial Conference Board to have been $5.10 per employee in the year 1930.[14] In the companies in which employees contributed to the cost of medical service, the cost per employee was $12.11, due largely, it is stated, to the extension of service to the employees' families.

The principal item in these costs is the salary of physicians and nurses, which made up about two-thirds of the total expenditure for medical service. The cost of safety and sanitary engineering service probably would not exceed $4.50 per employee per year. Thus from the estimated minimum profitable expenditure of $19,000 to $20,000 per annum per 1,000 employees for health and accident protection, a balance in excess of $9,000 to $10,000 per year per 1,000 workers is left for maintenance of the protective equipment and for amortization of the capital expenditures required.

ABSENCE DUE TO ILLNESS VERSUS VACATION

In view of the monetary savings estimated from a moderate decrease in the sickness time-lost rate, it may appear that a similar reduction in vacation time would also decrease employers' operating costs. There are certain important differences, however, which affect costs. Vacations are usually planned in advance so as to interfere as little as possible with the production schedule; sickness strikes suddenly and unexpectedly, often seriously disrupting an organization, especially when the number of cases reaches epidemic proportions. Furthermore, the seasonal peak of disability due to illness usually occurs in the late winter or early spring, when many industries are pushing production for the spring trade; vacations are most often taken during the summer slack in business. A few companies shut down their factories completely during the seasonal ebb in business activity to enable all employees to take vacations simultaneously, thereby saving the cost of light, power, and certain other items in the overhead. The stimulation effected by change in environment and the mental and physical refreshment resulting from vacations suited to the needs of the individual can scarcely be regarded, even from the economic standpoint, as "lost" time like that due to sickness.

SAVINGS TO EMPLOYEES FROM INDUSTRIAL MEDICAL SERVICE

The money value of industrial medical service to the employees may be estimated from the average annual per capita expenditure for medical care. Records of the costs of sickness were obtained from house-to-house canvasses in 130 communities at intervals of about 2 months during a 12-month period by the Committee on the

[14] Medical supervision and service in industry. National Industrial Conference Board Inc., New York, 1931, p. 104.

Costs of Medical Care. Among white persons whose annual income was in the $1,200 to $2,000 range, the average charge per capita for medical care during a 12-month period was found to be $13.17.[15] This amount includes items which would not be covered by an industrial medical service. For example, the Committee found that hospitalized illness consumed about 50 percent of the total bill, and this proportion obtained without important variation in all income classes. However, about 20 percent of the $13.17, or $2.63 per capita, represented the amount spent for medical care on account of ambulatory cases (nondisabling, and disabling illnesses not requiring confinement to bed).[16] Such cases are usually under the care of the industrial physician. In addition, minor illnesses which necessitate confinement to bed for a few days are often treated under the direction of the plant doctor. From unpublished data of the Committee on the Costs of Medical Care it appears that the charges for disabilities of less than one week's duration in families whose annual income was $1,200 to $2,000 averaged about $1 annually per person in the population. Thus a total of $3.63 per year may be estimated as the amount spent by the average industrial worker for medical care which falls within the province of the industrial physician. These estimates are only approximate, because they are based on the experience of all members of families having the income specified, without regard to age and sex. No figures are available for the medical charges incurred by the head of the family on himself. However, it appears that the average expenditure for medical care of $3.63 per capita, for nondisabling sickness and for cases causing disability of less than 1 week's duration, does not grossly overstate the size of the medical bill incurred for such illnesses by the industrial worker employed in an establishment having no industrial medical service.

In addition to the estimated annual saving of $3,600 per 1,000 employees, from the services usually furnished by an industrial medical organization, the reduction in time lost on account of disability or an equivalent saving from a decreased mortality rate should be considered, even though it may take several years to effect a favorable change in the morbidity or mortality rate. If the sickness and nonindustrial accident time-lost rate is reduced by two-thirds of a day per year per person on the pay roll, as has been done in certain companies, the saving in wages at a value of $4 per day would be $2,600 per year per 1,000 employees. If the disability rate fails to decrease, this sum could be earned several times over by the saving of one life per year per 1,000 employees. Thus without adding anything to the average amount which workmen spend for medical care, they

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[15] Falk, Klem, and Sinai: The incidence of illness and the receipt and costs of medical care among representative families. Committee on the Costs of Medical Care, Publication No. 26, 1933, p. 146.

[16] Ibid., Appendix table B-49, p. 302.

could employ a physician to serve them if the group approximated 1,200 to 1,300 persons, or could contribute about $4 per person per year for a rounded-out program of industrial medical and dental service as a mutual undertaking of employer and employee. On such an expenditure by employees a dividend of $2.60 per annum, a 65 percent return, could be expected within a few years from the moderate decrease in the average duration of disability previously discussed, or from a small curtailment of the mortality rate. These are minimum estimates; the potentialities of future developments in health work have been ignored. As one example of a cooperative activity which may prove to be of considerable monetary value both to employer and employee is the physical fitness examination and subsequent follow-up recently undertaken on an experimental basis by the Aetna Life Insurance Co.[17]

ESTIMATES SUMMARIZED

The estimated minimum monetary value to industry of medical and engineering services for the development of employee health and accident protection may be summarized as shown in table 1.

TABLE 1.—*Estimated minimum expectancy in savings to employer and to employees from indicated reduction of the accident rate and of the time lost on account of sickness (or an equivalent reduction in mortality), demonstrated as attainable, for establishments in which the industrial accident rate is considerably below the average and in which there are no occupational health hazards*

Items in the saving	Annual saving, per 1,000 employees
To the employer:	
Reduction of 7 compensable accidents from the present rate per 1,000 employees, or an equivalent decrease in noncompensable injuries and no-injury accidents which destroy property	$8,600
Reduction of two-thirds of a day in the sickness time-lost rate per 1,000 workers, or the equivalent in decreased mortality, estimated as worth to the employer 1½ times the amount paid in wages (average daily wage of $4 assumed)	4,000
Total to the employer	12,600
To the employees:	
Amount which employees spend for medical services which may be furnished by an industrial physician	3,600
Value of wages at $4 per day, saved by a reduction of two-thirds of a day in the sickness time-lost rate per 1,000 persons, or the equivalent in decreased mortality	2,600
Total to the employees	6,200
To both employer and employees	18,800

IMPORTANCE OF INDUSTRIAL ACCIDENT AND ILLNESS COSTS IN THE NATIONAL ECONOMY

The consumer seldom realizes the extent to which the costs of industrial accidents and sickness add to the price of products, or, stated in another way, decrease the purchasing power of the dollar.

[17] Described by Drs. W. R. P. Emerson and D. B. Cragin in "Health diagnosis in adults." Industrial Medicine, vol. 4, no. 1, January 1935.

The expenditure for medical care in the United States appears to have been approximately $3,600,000,000 in 1929.[18] If the indirect or hidden costs of sickness and accidents are assumed to be only 2.8 times the direct costs instead of 4.0 times as was found for *industrial* accidents, the annual bill to the Nation is about $10,000,000,000. An item of this magnitude obviously is an important factor in the cost of living.

One has to resort to the national debt to obtain figures large enough for comparative purposes. A 10-percent reduction in accidents and sickness, if maintained, would constitute a saving equivalent to liquidation, in slightly less than 3½ decades, of the present national debt of approximately $34,000,000,000; a 20-percent decrease would save enough to pay the entire sum in 17 years. A decrease of 10 to 20 percent in the incidence of accidents and in the time lost from sickness with accompanying prolongation of the average duration of life is not a visionary, impractical goal, judging from experience along that portion of the road in this direction which we have already traversed. The figures, sordid as they are in expressing health and life in terms of monetary units, nevertheless may afford a better sense of proportion, a more accurate conception of the relative importance of certain problems in the national welfare, if they call attention to the probability that an attainable curtailment of the present waste of vital assets would represent the equivalent in money value of complete liquidation of our huge national debt in less than two generations.

PLAGUE INFECTION DISCOVERED IN FLEAS AND LICE TAKEN FROM MARMOTS IN MONTANA AND IN A MARMOT IN UTAH

A report has been received, under date of August 10, 1936, from Surgeon C. R. Eskey, in charge of plague suppressive measures, San Francisco, Calif., that plague infection had been discovered in fleas and lice taken from ground hogs (marmots) which had been killed in Small Horn Canyon, Mont., about 12 miles southwest of Dillon, Beaverhead County. Following is Surgeon Eskey's report:

"Plague has been determined in both fleas and lice taken from 7 ground hogs (marmots) shot at the head of Small Horn Canyon, about 12 miles southwest of Dillon, Beaverhead County, Mont., July 25, 1936, by employees of the Rocky Mountain Laboratory. One hundred and fifty-three fleas and twenty-six lice were collected in separate bottles and inoculated into guinea pigs, which died in 6 and 3 days, respectively. Secondary inoculations and cultures gave typical plague reactions.

[18] Falk, Rorem, and Ring The costs of medical care. The Committee on the Costs of Medical Care, Publication No. 27, 1933, p 8

"These findings are of interest because they provide the first direct evidence that plague exists among marmots in America and demonstrate that the infection may be recovered from lice as well as fleas taken from these rodents. Fatal epizootics have been noted among marmots in a number of localities in Western States, but no infected animal has yet been found."

The foregoing report has been supplemented by later information (dated Aug. 13) received from Surgeon Eskey in which he states that plague has been determined in a sick ground hog (marmot) killed on July 31, 1936, in Indian Creek Canyon, 14 miles northeast of Beaver, Beaver County, Utah. This is believed to be the first plague-infected marmot reported in the United States.

DIRECTORY OF WHOLE-TIME COUNTY HEALTH OFFICERS, 1936

The information contained in this directory of whole-time county health officers was obtained through questionnaires sent to each State department of health. For the purpose of insuring uniformity in the returns, a "whole-time" county health officer was defined as "one who does not engage in the practice of medicine or in any other business but devotes all of this time to his official duties." Similar directories have been issued annually since 1922, with the exception of 1932. In 1935 the directory was issued as Reprint 1704 from the Public Health Reports.

The publication of directories of State health departments was begun in 1912 and, with the exception of the year 1932, has been continued without interruption to the present time The 1935 directory was issued as Reprint 1724.

Directories of city health officers have been published annually since 1916, with the exception of the years 1932 and 1935, when funds were not available for this purpose. In 1934 the directory was issued as Reprint 1685 from the Public Health Reports.

State and county	Name of health officer	Post office	Official title
Alabama:			
Autauga	E. L. Trammell, M. D.	Prattville	County health officer.
Baldwin	S. A. Durick, M. D.	Bay Minette	Do.
Barbour	E. M. Moore, M. D.	Clayton	Do.
Blount	S. D. Sturkie, M. D.	Oneonta	Do.
Bullock	H. E. Barker, M. D.	Union Springs	Do.
Calhoun	G. A. Cryer, M. D.	Anniston	Do.
Chambers	C. E. Johnson, M. D.	Lafayette	Do.
Cherokee	S. C. Tatum, M. D.	Centre	Do.
Chilton	J. M. Kimmey, M. D.	Clanton	Do.
Cleburne	F. R. Wood, M. D.	Heflin	Do.
Coffee	H. T. Donovan, M. D.	Elba	Do.
Colbert	G. W. Warrick, M. D.	Tuscumbia	Do.
Conecuh	E. L. Kelly, M. D.	Evergreen	Do.
Coosa	W. D. Burkhalter, M. D.	Rockford	Do.
Covington	C. D. McLeod, M. D.	Andalusia	Do.
Crenshaw	J. O. Foster, M. D.	Luverne	Do.

State and county	Name of health officer	Post office	Official title
Alabama—Continued.			
Cullman	M. S. Whiteside, M. D	Cullman	County health officer.
Dale	W. L. Orr, M. D	Ozark	Do.
Dallas	L. T. Lee, M. D	Selma	Do.
De Kalb	J. E. Dunn, M. D	Fort Payne	Do.
Elmore	L. G. Cole, M. D	Wetumpka	Do.
Escambia	E. F. Goldsmith, M. D	Brewton	Do.
Etowah	O. L. Murphree, M. D	Gadsden	Do.
Franklin	N. P. Underwood, M. D	Russellville	Do.
Henry	P. M. Thompson, M. D	Abberville	Do.
Houston	F. G. Granger, M. D	Dothan	Do.
Jackson	G. E. Newton, M. D	Scottsboro	Do.
Jefferson	J. D. Dowling, M. D	Birmingham	Do.
Lamar	W. J. B. Owings, M. D	Vernon	Do.
Lauderdale	W. D. Hubbard, M. D	Florence	Do.
Lawrence	R. E. Harper, M. D	Moulton	Do.
Lee	H. C. McRee, M. D	Opelika	Do.
Limestone	W. A. Minsch, M. D	Athens	Do.
Lowndes	E. F. Leatherwood, M. D	Hayneville	Do.
Macon	Murray Smith, M. D	Tuskegee	Do.
Madison	W. C Hatchett, M. D	Huntsville	Do.
Marengo	E. T. Norman, M. D	Linden	Do.
Marion	W. T. Burkett, M. D	Hamilton	Do.
Marshall	Lee Weathington, M. D	Guntersville	Do.
Mobile	O. L. Chason, M. D	Mobile	Do.
Monroe	R. D. Neal, M. D	Monroeville	Do.
Montgomery	J. L. Bowman, M. D	Montgomery	Do.
Morgan	L. R. Murphree, M. D	Decatur	Do.
Perry	J R. Long, M. D	Marion	Do.
Pickens	J. J. Croley, M. D	Carrollton	Do.
Pike	W. H. Abernethy, M. D	Troy	Do.
Randolph	W. E. Coleman, M. D	Wedowee	Do.
Russell	M. L. Shaddix, M. D	Phenix City	Do.
Shelby	H. C. Nickson, M. D	Columbiana	Do.
Sumter	S. J. Williams, M. D	Livingston	Do.
Talladega	J. H. Hill, M. D	Talladega	Do.
Tallapoosa	C. C. Fargason, M. D	Dadeville	Do.
Tuscaloosa	A. A. Kirk, M. D	Tuscaloosa	Do.
Walker	A. M. Waldrop, M. D	Jasper	Do.
Washington	I. C. Sumner, M. D	Chatom	Do.
Wilcox	E. L. McIntosh, M. D	Camden	Do.
Winston	S. W. Shelton, M. D	Double Springs	Do.
Arizona:			
Cochise	R. B. Durfee, M. D	Bisbee	Director.
Gila	G. F. Manning	Globe	Do.
Maricopa	A. N. Crain, M. D	Phoenix	Do.
Pima	L. H. Howard	Tucson	Do.
Arkansas:			
Benton, Crawford, and Washington.	Fount Richardson, M. D	Fayetteville	Do.
Ashley	A. M. Gibbs, M. D., C. P. H.	Hamburg	Do.
Clark	T. T. Ross, B. S., M. P. H.	Arkadelphia	Do.
Crittendon	B. M. Stevenson, M. D	Marion	Do.
Garland	J. F. Merritt, M. D	Hot Springs	Do.
Jackson	M. B. Owens, M. D	Newport	Do.
Jefferson	W. H. Bruce, M. D	Pine Bluff	Do.
Little River	J. W. Ringgold, M. D	Ashdown	Do.
Mississippi	A. M. Washburn, B. S., M. D.	Blytheville	Do.
Ouachita	R. C. Kennerly, M. D	Camden	Do.
Phillips	W. B. Bruce, M. D	Helena	Do.
Pope	A. B. Tate, M. D	Russellville	Do.
Pulaski	J. A. Summers, M. D	Little Rock	Do.
Saline	D. W. Fulmer, M. D	Benton	Do.
Sebastian	J. E. Johnson, M. D	Fort Smith	Do.
Woodruff	J. F. Hays, M. D	Augusta	Do.
Yell	J. K. Grace, B. S., M. D	Danville	Do.
Monroe	*W. P. Scarlett, M. D	Clarendon	Do.
Conway	*W. Myers Smith, B. S., M. D.	Morrilton	Do.
California:			
Alameda	I. C. Church, M. D	Oakland	County health officer.
Contra Costa	W. A. Powell	Martinez	Do.
Fresno	W. F. Stein, M. D	Fresno	Do.
Imperial	W. F. Fox, M. D	El Centro	Do.
Los Angeles	John L. Pomeroy, M. D	Los Angeles	Do.
Madera	L. A. Stone, M. D	Madera	Do.
Monterey	R. M. Fortier, M. D	Salinas	Do.
Orange	K. H. Sutherland, M. D	Santa Ana	Do.
Riverside	W. A. Jones, M. D	Riverside	Do.
San Bernardino	E. B. Godfrey, M. D	San Bernardino	Do.
San Diego	A. M. Lesem, M. D	San Diego	Do.

* Rockefeller fellowships; attending Harvard University.

State and county	Name of health officer	Post office	Official title
California—Continued.			
San Joaquin	J. J. Sippy, M. D	Stockton	County health officer.
San Luis Obispo	A. F. Gillihan, M. D	San Luis Obispo	Do.
Santa Barbara	R. C. Main, M D	Santa Barbara	Do.
Stanislaus	E. F. Reamer, M. D	Modesto	Do.
Connecticut:			
Fairfield [1]	Lawrence E. Poole, M. D	Fairfield	Health officer.
West Hartford [1]	Harry B. Smith, M. D., M. P. H.	West Hartford	Director of health.
Delaware:			
Kent	E. F. Smith, M. D	Dover	County health officer.
New Castle	J. R. Downs, M. D	Newark	Do.
Sussex	F. I. Hudson, M. D	Georgetown	Do.
Florida:			
Escambia	Wm. H. Pickett	Pensacola	Director.
Jackson	F. V. Chappell, M. D	Marianna	Do.
Leon	L. J. Graves, M. D	Tallahassee	Do.
Georgia:			
Baldwin	O. F. Moran, M. D	Milledgeville	Commissioner of health.
Bartow	A. C. Shamblin, M. D	Cartersville	Do.
Bibb	J. D. Applewhite, M. D., M. P. H.	Macon	Do.
Chatham	Victor H. Bassett, M. D	Savannah	Do.
Clarke	W. W. Brown, M. D	Athens	Do.
Cobb	J. E. Lester, M. D	Marietta	Do.
Colquitt	T. E. Chesnutt, M. D	Moultrie	Do.
Decatur	M. A. Fort, D. P. H., M. D., Ph. G.	Bainbridge	Do.
De Kalb	J. R. Evans, M. D., Ph. G	Decatur	Do.
Dougherty	Hugo Robinson, M. D	Albany	Do.
Floyd	B. V. Elmore, M. D	Rome	Do.
Fulton	W. L. Gilbert, M. D	Atlanta	Do.
Glynn, McIntosh, Camden.	M. E. Winchester, C. P. H., M. D., D. P. H.	Brunswick	Do.
Grady	H. P. Rankin, M. D	Cairo	Do.
Hall	C. J. Wellborn, M. D	Gainesville	Do.
Jefferson	L. R. Bryson, M. D	Louisville	Do.
Jenkins	H. B. Senn, M. D	Millen	Do.
Laurens	O. H. Cheek, M. D	Dublin	Do.
Lowndes	G. T. Crozier, M. D., D. P. H.	Valdosta	Do.
Mitchell	C. O. Rainey, M. D	Camilla	Do.
Richmond	H. G. Callison, M. D	Augusta	Do.
Spalding	W. C. Humphries, M. D	Griffin	Do.
Sumter	A. J. Davis, M. D	Americus	Do.
Terrell	R. Frank Cary, M. D	Dawson	Do.
Thomas	J. R. Dykes, M. D	Thomasville	Do.
Troup	S. C. Rutland, M. D	LaGrange	Do.
Walker-Catoosa	Charles W. Folsom, M. D	LaFayette	Do.
Ware	George E. Atwood, M. D., D. P. H.	Waycross	Do.
Washington	O. L. Rogers, M. D	Sandersville	Do.
Indiana:			
Lake	William D. Weis, M. D	Crown Point	County health commissioner.
Iowa:			
Woodbury	Wallace S. Petty, M. D	Sioux City	County health officer.
Kansas:			
Lyon	C. H. Munger, M. D	Emporia	Do.
Sedgwick	J. C. Montgomery, M. D	Wichita	Do.
Shawnee	F. E. McCord, M. D	Topeka	Do.
Kentucky:			
Adair	N. A. Mercer, M. D., M. P. H.	Columbia	Do.
Allen	C. W. Holland, M. D	Scottsville	Do.
Anderson	S. R. Boggess, M. D	Lawrenceburg	Do.
Ballard	C. B. Billington, M. D	Wickliffe	Do.
Barren	W. M. Chapman, M. D	Glasgow	Do.
Bath	J. S. Goodpaster, M. D	Owingsville	Do.
Bell	A. D. Stacy, M. D	Pineville	Do.
Boyd	R. D. Higgins, M. D	Ashland	Do.
Breathitt	Earl E. Gambrill, M. D	Jackson	Do.
Butler	C. C. Threlkel, M. D	Morgantown	Do.
Caldwell	B. K. Amos, M. D	Princeton	Do.
Calloway	J. A. Outland, M. D	Murray	Do.
Carlisle	J. F. Harrell, M. D	Bardwell	Do.
Carter	Don E. Wilder, M. D	Grayson	Do.
Casey	J. W. Scudder, M. D	Liberty	Do.
Clay	L. H. Wagers, M. D	Manchester	Do.
Clinton	W. G. Morgan, M. D	Albany	Do.
Edmonson	H. H. Bishop, M. D	Brownsville	Do.
Elliott	R. E. Wehr, M. D	Sandy Hook	Do.
Estill	R. R. Snowden, M. D	Irvine	Do.
Fayette	Charles D. Cawood, M. D., C. P. H.	Lexington	Do.

[1] Town.

State and county	Name of health officer	Post office	Official title
Kentucky—Continued,			
Fleming	C. W. Christine, M. D	Flemingsburg	County health officer.
Floyd	Marvin Ransdell, M. D	Prestonsburg	Do.
Fulton	Hugh E. Prather, M. D	Hickman	Do.
Gallatin	J. W. Miller, M. D	Warsaw	Do.
Grant	N. H. Ellis, M. D	Williamstown	Do.
Grayson	J. G. Samuels, M. D	Leitchfield	Do.
Green	J. M. Dishman, M. D	Greensburg	Do.
Greenup	Carl M. Gambill, M. D., M. P. H.	Greenup	Do.
Hart	Temporary vacancy	Munfordville	Do.
Henderson	J. Leland Tanner, M. D., M. P. H.	Henderson	Do.
Hickman	Chas. Hunt, M. D	Clinton	Do.
Hopkins	C. R. Morton, M. D	Madisonville	Do.
Jefferson	John D. Trawick, M. D	Louisville	Do.
Kenton	H. C. White, M. D	Covington	Do.
Knott	J. W. Duke, M. D	Hindman	Do.
Knox	W. V. Bradshaw, M. D	Barbourville	Do.
Laurel	G. S. Brock, M. D	London	Do.
Lawrence	W. C. Gose, M. D	Louisa	Do.
Lee	E. M. Brown, M. D	Beattyville	Do.
Leslie	D. D. Turner, M. D	Hyden	Do.
Letcher	R. D. Collins, M. D	Whitesburg	Do.
Lincoln	K. T. Johnstone, M. D	Stanford	Do.
Lyon	N. M. Atkins, M. D	Eddyville	Do.
McCracken	R. E. Teague, M. D., C. P. H.	Paducah	Do.
McCreary	Temporary vacancy	Whitley City	Do.
McLean	do	Calhoun	Do.
Madison	H. G. Wells, M. D., C. P. H.	Richmond	Do.
Magoffin	H. K. Bailey, M. D	Salyersville	Do.
Marshall	S. L. Henson, M. D	Benton	Do.
Martin	Wm. N. Keith, M. D	Inez	Do.
Mason	O. M. Goodloe, M. D., M. P. H.	Maysville	Do.
Meade	O. R. Lynch, M. D	Brandenburg	Do.
Menifee	E. T. Riley, M. D	Frenchburg	Do.
Metcalfe	H. T. Carter, M. D	Edmonton	Do.
Monroe	A. S. Yates, M. D	Tompkinsville	Do.
Muhlenberg	Roy Orsburn, M. D	Greenville	Do.
Nicholas	E. W. Atherton, M. D	Carlisle	Do.
Ohio	A. D. Park, M. D	Hartford	Do.
Owsley	J. R. Akers, M. D	Booneville	Do.
Perry	D. D. Carr, M. D., M. P. H.	Hazard	Do.
Pike	Chas. P. Shields, M. D	Pikeville	Do.
Powell	M. H. Skaggs, M. D	Stanton	Do.
Pulaski	D. A. Reekie, M. D	Somerset	Do.
Rockcastle	Walker Owens, M. D	Mt. Vernon	Do.
Rowan	T. A. E. Evans, M. D	Morehead	Do.
Scott	R. J. Griffin, M. D	Georgetown	Do.
Spencer	M. W. Caskey, M. D	Taylorsville	Do.
Todd	L. A. Crosby, M. D	Elkton	Do.
Trigg	E. W. Sigler, M. D	Cadiz	Do.
Trimble	J. J. Gerkins, M. D	Bedford	Do.
Union	A. Y. Covington, M. D	Morganfield	Do.
Warren	G. M. Wells, M. D	Bowling Green	Do.
Wayne	Mack Roberts, M. D	Monticello	Do.
Webster	C. M. Smith, M. D	Dixon	Do.
Wolfe	J. L. Cox, M. D	Campton	Do.
Louisiana: [1]			
Acadia	J. D. Hunter, M. D	Crowley	Director.
Assumption	P. M. Payne, M. D	Napoleonville	Do.
Avoyelles	L. W. Holloman, M. D	Marksville	Do.
Caddo	W. J. Sandidge, M. D., C. P. H.	Shreveport	Do.
Caldwell	Thomas Burk, M. D	Columbia	Do.
Catahoula	L. C. Spencer, M. D	Harrisonburg	Do.
Claiborne	H. B. Marlatt, M. D., C. P. H.	Homer	Do.
Concordia	Jno. Schreiber, M. D	Vidalia	Do.
De Soto	R. A. Tharp, M. D	Mansfield	Do.
East Carroll	F. V. Boyd, M. D	Lake Providence	Do.
Franklin	R. E. Applewhite	Winnsboro	Do.
Iberia	B. L. Stinson, M. D	New Iberia	Do.
Iberville	J. C. Eby, Phar. D., M. D	Plaquemine	Do.
Jefferson Davis	C. F. Lacey, M. D	Jennings	Do.
Lafayette	A. J. Comeaux, M. D	Lafayette	Do.
Lafourche	H. S. Smith, M. D	Thibodaux	Do.
LaSalle	E. L. Miller, M. D	Jena	Do.
Lincoln	R. H. Allen, M. D	Ruston	Do.
Madison	E. S. Freeman, M. D	Tallulah	Do.
Morehouse	N. P. Liles, M. D	Bastrop	Do.
Natchitoches	W. W. Knipmeyer, M. D., C. P. H.	Natchitoches	Do.

[1] Parish.

State and county	Name of health officer	Post office	Official title
Louisiana—Continued.			
Ouachita	G. D. Williams, M. D	Monroe	Director.
Pointe Coupee	W. L. Treuting, M. D	New Roads	Do.
Rapides	B. J. Aymond, M. D	Alexandria	Acting director.
Red River	Bernard Hochfelder, M. D	Coushatta	Director.
Richland	R. O. C. Green, M. D	Rayville	Do.
St. Landry	L. A. Masterson, M. D	Opelousas	Do.
St. Martin	P. H. Fleming, M. D	St. Martinville	Do.
St. Mary	W. W. Pomboeuf, M. D	Franklin	Do.
Tensas	N. G. Norris, M. D	St. Joseph	Do.
Terrebonne	M. F. Houston, M. D	Houma	Do.
Washington	F. A. Williams, M. D	Franklinton	Do.
Webster	W. C. Summer, M. D	Minden	Do.
West Carroll	F. S. Williams, M. D	Oak Grove	Do.
Maine: [3]			
Cooperative Health Union:			
Franklin	B. L. Arms, M. D	Farmington	Do.
Hancock	Frank O. Alley, B. S	Bar Harbor	Local health officer.
Motbov Union	H. L. Jackson, M. D	Old Town	Do.
Oxford	T. S. Burr, M. D	Rumford	Do.
Maryland:			
Allegany	J. P. Franklin, M. D	Cumberland	Deputy State health officer.
Do	John M. Byers, M. D	do	Assistant deputy State health officer.
Anne Arundel	John H. Janney, Jr., M. D	Annapolis	Deputy State health officer.
Do	H. R. DuPuy, M. D	do	Assistant deputy State health officer.
Baltimore	J. S. Bowen, M. D	Towson	Deputy State health officer.
Do	Edward R. Davies, M. D	do	Assistant deputy State health officer.
Calvert	I. N. King, M. D	Prince Frederick	Deputy State health officer.
Caroline	Temporary vacancy		Do.
Carroll	W. C. Stone, M. D	Westminster	Do.
Cecil	C. A. Kane, M. D	Elkton	Do.
Charles	D. St. Clair Campbell, M. D	La Plata	Do.
Dorchester	E. A. Jones, M. D	Cambridge	Do.
Frederick	E. C. Kefauver, M. D	Frederick	Do.
Garrett	E. O. Peck, M. D., M. P. H	Oakland	Do.
Harford	T. A. Callahan, M. D	Bel Air	Do.
Howard	W. J. French, M. D	Ellicott City	Do.
Kent	Temporary vacancy	Chestertown	Do.
Montgomery	V. L. Ellicott, M. D., Dr. P. H.	Rockville	Do.
Prince Georges	A. B. Hooton, M. D	Upper Marlboro	Do.
Queen Annes	J. A. McCallum, M. D	Centerville	Do.
St. Mary	D. St. Clair Campbell	La Plata	Do.
Somerset	R. H. Johnson, M. D	Princess Anne	Do.
Talbot	L. S. Welty, M. D	Easton	Do.
Washington	W. R. Cameron, M. D	Hagerstown	Do.
Wicomico	S. H. Hurdle, M. D	Salisbury	Do.
Worcester	Bradford Massey, M. D	Pocomoke	Do.
Massachusetts:			
Barnstable	Almon P. Goff, M. D	Hyannis	County health officer.
Nashoba [4]	James O. Wails, M. D., C. P. H.	Ayer	Director of public health.
Southern Berkshire [4]	Harold W. Stevens, M. D	Great Barrington	Medical director.
Michigan:			
Allegan	G. M. Byington, M. D	Allegan	Director.
Barry	R. B. Harkness, M. D	Hastings	Do.
Branch	F. S. Leeder, M. D., D. P. H.	Coldwater	Do.
Calhoun	M. R. Kinde, M. D	Marshall	Do.
Eaton	J. W. Davis, M. D	Charlotte	Do.
Genesee	D. C. Peterson, M. D., C. P. H.	Flint	Do.
Hillsdale	E. G. McGavran, M. D., C. P. H.	Hillsdale	Do.
Isabella	F. R. Town, M. D	Mount Pleasant	Do.
Kent	J. D. Brook, M. D	Grand Rapids	Do.
Midland	David Littlejohn, M. D., D. P. H.	Midland	Do.
Oakland	J. D. Monroe, M. D	Pontiac	Do.
Ottawa	Ralph TenHave, M. D., C. P. H.	Grand Haven	Do.
Saginaw	William H. Pickett, M. D., C. P. H.	Saginaw	Do.
Van Buren	T. R. Meyer, M. D., D. P. H.	Paw Paw	Do.
Wexford	S. C. Moore, M. D	Cadillac	Do.

[3] Township or district.
[4] District.

State and county	Name of health officer	Post office	Official title
Michigan—Continued.			
District health unit Kalkaska. Crawford. Missaukee. Roscommon.	T. R. Laughbaum, M. D.	Lake City	Director.
District health unit Alcona. Iosco. Oscoda. Ogemaw.	Gladys J. Kleinschmidt, M. D., M. S.	West Branch	Do.
District health unit Antrim. Charlevoix. Emmet. Otsego.	Carleton Dean, M. D., C. P. H.	Charlevoix	Do.
District health unit Alpena. Cheboygan. Montmorency. Presque Isle.	G. B. Moffat, M. D , D. P. H.	Rogers City	Do.
District health unit Lake. Newaygo. Oceana.	Guy R. Post, M. D., C. P. H.	White Cloud	Do.
District health unit Luce. Mackinac. Schoolcraft.	O. D. Hart, M. D., C. P. H.	Newberry	Do.
District health unit Clare. Gladwin. Arenac.	E. V. Thiehoff, M. D.	Gladwin	Do.
Wayne County Health District, township of Grosse Pointe. Villages of— Grosse Pointe Park. Grosse Pointe Farms. Grosse Pointe Shores. Grosse Pointe (city). Lochmoor.	B. H. Warren, M. D.	Grosse Pointe	Do.
Minnesota:			
St. Louis	Carl A. Scherer, M. D.	Duluth	County health officer.
Mississippi:			
Adams	Alton R. Perry, M. D., M. P. H.	Natchez	Director.
Bolivar	R. D. Dedwylder, M. D.	Cleveland	Do.
Coahoma	N. C. Knight, M. D., C. P. H.	Clarksdale	Do.
Copiah	J. C. McGuire, M. D.	Hazlehurst	Do.
Forrest	B. D. Blackwelder, M. D., C. P. H.	Hattiesburg	Do.
Hancock	C. M. Shipp, M. D.	Bay St. Louis	Do.
Harrison	D. J. Williams, M. D.	Gulfport	Do.
Hinds	W. E. Noblin, M. D.	Jackson	Do.
Holmes	C. J. Vaughn, M. D., C. P. H.	Lexington	Do.
Humphreys	J. W. Barkley, M. D.	Belzoni	Do.
Jackson	R. G. Lander, M. D.	Pascagoula	Do.
Lamar	J. N. Mason, M. D.	Purvis	Do.
Lauderdale	D. V. Galloway, M. D., M. P. H.	Meridian	Do.
Lee	W. H. Cleveland, M. D.	Tupelo	Do.
Leflore	L. A. Barnett, M. D.	Greenwood	Do.
Lincoln	W. R. May, M. D., C. P. H.	Brookhaven	Do.
Marshall	V. B. Harrison, M. D., C. P. H.	Holly Springs	Do.
Monroe	C. H. Love, M. D.	Aberdeen	Do.
Pearl River	G. E. Godman, M. D.	Poplarville	Do.
Pike	T. Paul Haney, Jr., M. D., C. P. H.	McComb	Do.
Sharkey	A. K. Barrier, M. D.	Rolling Fork	Do.
Sunflower	H. B. Cottrell, M. D., C. P. H.	Indianola	Do.
Union	I. B. Trapp, M. D.	New Albany	Do.
Warren	F. Michael Smith, M. D.	Vicksburg	Do.
Washington	John W. Shackelford, M. D., M. P. H.	Greenville	Do.
Yazoo	H. L. McCalip, M. D., C. P. H.	Yazoo City	Do.

State and county	Name of health officer	Post office	Official title
Missouri:			
Buchanan	W. S. Hull, M. D	St. Joseph	Director.
Dunklin	Wheeler Davis, M. D	Kennett	Do.
Greene	R. L. Russell, M. D	Springfield	Do.
Jackson	J. T. Brennan, M. D	Independence	Do.
Marion	E. M. Lucke, M. D	Hannibal	Do.
Miller	L. M. Garner, M. D., C. P. H	Tuscumbia	Do.
Montana:			
Cascade	F. L. Watkins, M. D	Great Falls	County health officer.
Gallatin	A. D. Brewer, M. D	Bozeman	Do.
Missoula	F. D. Pease, M. D	Missoula	Do.
New Hampshire:			
Concord	Travis P. Burroughs, M. D	Concord	Health officer.
Keene	Evan P. White, M. D	Keene	Do.
Manchester	Howard A. Streeter, M. D	Manchester	Do.
New Mexico:			
First Health District	E. F. McIntyre, M. D., B. S	Santa Fe	District health officer.
Santa Fe.			
Rio Arriba.			
Taos.			
Second Health District	E. B. Beaver, M. D	Gallup	Do.
McKinley.			
San Juan.			
Third Health District	James R. Scott, M. D., Ph. D	Albuquerque	Do.
Bernalillo.			
Sandoval.			
Fourth Health District	O. W. Gerber, M. D	Las Cruces	Do.
Dona Ana.			
Otero.			
Lincoln.			
Sierra.			
Fifth Health District	W. W. Johnston, M. D	Las Vegas	Do.
San Miguel.			
Mora.			
Guadalupe.			
Sixth Health District	O. E. Puckett, M. D	Carlsbad	Do.
Chaves.			
Eddy.			
Lea.			
Seventh Health District.	Frank W. Parker, M. D	Silver City	Do.
Grant.			
Luna.			
Hidalgo.			
Eighth Health District	Julian O. Long, M. D	Los Lunas	Do.
Catron.			
Socorro.			
Valencia.			
Torrance.			
Ninth Health District	Frank C. Diver, M. D	Raton	Do.
Colfax.			
Harding.			
Union.			
Tenth Health District	L. A. Dewey, M. D., B. S., C. P. H.	Portales	Do.
Curry.			
Roosevelt.			
Quay.			
DeBaca.			
New York:			
Cattaraugus [5]	H. R. O'Brien, M. D., C. P. H., A. B., M. A.	Olean	Commissioner of health.
Columbia [5]	L. Van Hoesen, M. D	Hudson	Do.
Cortland [5]	M. R. French, M. D., A. B	Cortland	Do.
Suffolk [5]	A. T. Davis, M. D	Riverhead	Do.
Westchester [5]	M. Nicoll, Jr., M. D	White Plains	Do.
District	H. J. Ball, M. D	Utica	District State health officer.
Herkimer.			
Madison.			
Oneida.			
District	R. D. Champlin, M. D., C. P. H.	Oneonta	Do.
Chenango.			
Delaware.			
Otsego.			
Schoharie.			
District	J. A. Conway, M. D	Hornell	Do.
Broome.			
Chemung.			
Steuben.			
Tioga.			
Tompkins.[6]			

[5] Under direct supervision of the county health commissioner and general supervision of the district State health officer.
[6] Under direct supervision of Dr. VanVolkenburgh and general supervision of Dr. Conway.

State and county	Name of health officer	Post office	Official title
New York—Continued.			
District	F. E. Coughlin, M. D., A. B., Dr. P. H.	Albany	District State health officer.
Albany.			
Columbia.[5]			
Greene.			
Rensselaer.			
District	A. S Dean, M. D., B. S., Dr. P. H.	Buffalo	Do.
Cattaraugus.[5]			
Chautauqua.			
Erie.			
Genesee.			
Niagara.			
Orleans.			
Wyoming.			
District	M. D. Dickinson, M. D	New York City	Do.
Nassau.			
Suffolk.			
District	B. Diefendorf, M. D	Ticonderoga	Do.
Clinton.			
Essex			
Franklin.			
Hamilton.[6]			
Warren.			
Washington.			
District	C. R. Hervey, M. D	Oswego	Do.
Cayuga.[7]			
Oswego.			
Wayne.			
District	F. W. Laidlaw, M. D	Middletown	Do.
Orange.			
Rockland.			
Sullivan.			
Ulster.			
Westchester.[5]			
District	B. E. Roberts, M. D., B. S	Poughkeepsie	Do.
Dutchess.			
Putnam.			
District	S. W. Sayer, M. D	Gouverneur	Do.
Jefferson.			
Lewis.			
St. Lawrence.			
District	P. J. Rafle, M. D., C. P. H	Syracuse	Do.
Cayuga.[7]			
Cortland.[5]			
Onondaga.			
Seneca.			
District	B. R. Wakeman, M. D	Hornell	Do.
Allegany.			
Livingston.			
Monroe.			
Ontario.			
Schuyler.			
Yates.			
District	J. S. Walton, M. D	Amsterdam	Do.
Fulton.[8]			
Hamilton.[6]			
Montgomery.[8]			
Saratoga.			
Schenectady.			
District	J. E. Perkins, M. D., Dr. P. H.	Amsterdam	Do.
Fulton.[8]			
Montgomery.[8]			
District	V. A. VanVolkenburgh, M. D., B. S., Dr. P. H.	Ithaca	Do.
Tompkins.[9]			
North Carolina:			
Beaufort	David Emerson Ford, M. D	Washington	County health officer.
Bertie	Frank H Garriss, M. D	Windsor	Do.
Bladen	Robert S. Cromartie, M. D	Elizabethtown	Do.
Buncombe	Howard L. Sumner, M. D	Asheville	Do.
Cabarrus	Daniel G. Caldwell, M. D	Concord	Do.
Columbus	Floyd Johnson, M. D	Whiteville	Do.
Cumberland	Malcolm T. Foster, M. D	Fayetteville	Do.
Davidson	Grover C. Gambrell, M. D	Lexington	Do.

[5] Under direct supervision of the county health commissioner and general supervision of the district State health officer.
[6] Long Lake and Indian Lake Townships under supervision of Dr. Diefendorf; remainder of county under supervision of Dr. Walton.
[7] Townships of Sterling, Victory, Ira, Conquest, and Cato under supervision of Dr. Hervey; remainder of county under supervision of Dr. Rafle.
[8] Under direct supervision of Dr. Perkins and general supervision of Dr. Walton.
[9] Under direct supervision of Dr. VanVolkenburgh and general supervision of Dr. Conway.

State and county	Name of health officer	Post office	Official title
North Carolina—Contd.			
Duplin	Ransom Lee Carr, M. D.	Kenansville	County health officer.
Durham	Jesse H. Epperson	Durham	Do.
Edgecombe	Lorenzo Lynn Parks, M. D.	Tarboro	Do.
Franklin	Richard Fenner Yarborough, M. D.	Louisburg	Do.
Gaston	Robert Edgar Rhyne, M. D.	Gastonia	Do.
Granville	Joseph A. Morris, M. D.	Oxford	Do.
Guilford	Roderick Mark Buie, M. D.	Greensboro	Do.
Halifax	Robert S. McGeachy, M. D.	Weldon	Do.
Hyde (Ocracoke Island)	Sigma Van Lewis, M. D.	Ocracoke	Health officer.
Lenoir	Zebulon Vance Moseley, M. D.	Kinston	County health officer.
Mecklenburg	Edgar Hall Hand, M. D.	Charlotte	Do.
Moore	John Symington, M. D.	Carthage	Do.
Nash	Thomas O. Coppedge, M. D.	Nashville	Do.
New Hanover	Avon Hall Elliot, M. D.	Wilmington	County health officer.
Northampton	Marion Henry Seawell, M. D.	Jackson	Do.
Orange-Person	William P. Richardson, M. D.	Chapel Hill	Do.
Pitt	N. Thomas Ennett, M. D.	Greenville	Do.
Randolph	George Herbert Sumner, M. D	Asheboro	Do.
Richmond	Bennie B. Dalton, M. D.	Rockingham	Do.
Robeson	Eugene Ramsey Hardin, M. D.	Lumberton	Do.
Rowan	Charles W. Armstrong, M. D.	Salisbury	Do.
Rutherford	Robert M. Bardin, M. D.	Rutherfordton	Do.
Sampson	Wyman Plato Starling, M. D.	Clinton	Do.
Surry	Ralph J. Sykes, M. D.	Mount Airy	Do.
Vance	Zack Perry Mitchell, M. D.	Henderson	Do.
Wake	Alexander Chester Bulla, M. D.	Raleigh	Do.
Wayne	Samuel B. McPheeters, M. D.	Goldsboro	Do.
Wilkes	Albert Johnson Eller, M. D.	Wilkesboro	Do.
Wilson	Wade Hampton Anderson, M. D.	Wilson	Do.
Districts:			
Avery-Watauga-Yancey.	Clarence Hunt White, M. D.	Burnsville	District health officer.
Forsyth-Stokes-Yadkin.	John Roy Hege, M. D.	Winston-Salem	Do.
Haywood-Jackson-Swain.	Crete Nixon Sisk, M. D.	Waynesville	Do.
Ohio:			
Athens	J. M. Higgins, M. D.	Athens	County health officer.
Butler	C. J. Baldridge, M. D.	Hamilton	Do.
Clinton	W. K. Ruble, M. D.	Wilmington	Do.
Crawford	G. T. Wasson, M. D.	Bucyrus	Do.
Cuyahoga	Robert Lockhart, M. D.	Cleveland	Do.
Darke	W. D. Bishop, M. D.	Greenville	Do.
Delaware	B. B. Barber, M. D.	Delaware	Do.
Erie	F. M. Houghtaling, M. D.	Sandusky	Do.
Fayette	James F. Wilson, M. D.	Washington C. H.	Do.
Guernsey	D. L. Cowden, M. D.	Cambridge	Do.
Hamilton	E. H. Schoenling, M. D.	Cincinnati	Do.
Hancock	S. F. Whisler, M. D.	Findlay	Do.
Hocking	W. B. Lacock, M. D.	Logan	Do.
Huron	B. O. Pilkey, M. D.	Norwalk	Do.
Jefferson	J. P. Young, M. D.	Steubenville	Do.
Lorain	F. R. Dew, M. D.	Oberlin	Do.
Lucas	T. W. Mahoney, M. D.	Toledo	Do.
Madison	Robert Trimble, M. D.	London	Do.
Mahoning	G. Y. Davis, M. D.	Youngstown	Do.
Marion	N. Sifritt, M. D.	Marion	Do.
Medina	John L. Jones, M. D.	Medina	Do.
Meigs	W. S. Ellis, M. D.	Pomeroy	Do.
Mercer	F. E. Ayers, M. D.	Celina	Do.
Miami	E. R. Hiatt, M. D.	Troy	Do.
Montgomery	H. H. Pansing, M. D.	Dayton	Do.
Muskingum	Beatrice Hagen, M. D.	Zanesville	Do.
Perry	F. J. Crosbie, M. D.	New Lexington	Do.
Pickaway	V. D. Kerns, M. D.	Circleville	Do.
Preble	J. I. Nisbet, M. D.	Eaton	Do.
Richland	M. C. Hanson, M. D.	Mansfield	Do.
Ross	R. E. Bower, M. D.	Chillicothe	Do.
Seneca	D. W. Fellers, M. D.	Tiffin	Do.
Shelby	A. B. Lippert, M D.	Sidney	Do.
Stark	Floyd R. Stamp, M. D.	Canton	Do.
Summit	R. H. Markwith, M. D.	Akron	Do.
Trumbull	L. A. Connell, M. D.	Warren	Do.
Washington	Alfred G. Sturgiss, M. D.	Marietta	Do.
Wayne	W. G. Rhoten, M. D.	Wooster	Do.
Wood	H. J. Powell, M. D.	Bowling Green	Do.
Wyandot	L. W. Naus, M. D.	Upper Sandusky	Do.
Oklahoma:			
LeFlore	Rush L. Wright, M. D.	Poteau	Do.
Seminole	George Hunter, M. D.	Wewoka	Do.

State and county	Name of health officer	Post office	Official title
Oregon:			
Clackamas	Courtney Smith, M. D.	Oregon City	County health officer.
Douglas	J. E. Campbell, M. D.	Roseburg	Do.
Jackson	A. N. Johnson, M. D.	Medford	Do.
Klamath	G. S. Newsom, M. D.	Klamath Falls	Do.
Lane	R. C. Romig, M. D.	Eugene	Do.
Marion	Vernon Douglas, M. D.	Salem	Do.
Multnomah	Harry R. Cliff, M. D.	Portland	Do.
Rhode Island:			
Jamestown	Mrs. Margaret Eddy	Jamestown	Health officer
North Kingstown	George L. Salisbury, M. D., D. V. M.	Wickford	Do.
South Carolina:			
Aiken	J. T. Hair, M. D.	Aiken	Do.
Anderson	E. E. Epting, M. D.	Anderson	Do.
Beaufort	S. Simons, M. D.	Beaufort	Do.
Berkeley	W. K. Fishburne, M. D.	Moncks Corner	Do.
Charleston	Leon Banov, M. D.	Charleston	Do.
Cherokee	E. P. White, M. D.	Gaffney	Do.
Clarendon	G. H. Zerbst, M. D.	Manning	Do.
Darlington	W. A. Carrigan, M. D.	Darlington	Do.
Dillon-Marion	H. F. Wilson, M. D.	Dillon	Do.
Dorchester	B. M. Montgomery, M. D.	St. George	Do.
Fairfield	J. L. Bryson, M. D.	Winnsboro	Do.
Florence	J. R. Claussen, M. D.	Florence	Do.
Georgetown	G. S. T. Peeples, M. D.	Georgetown	Do.
Greenville	Baylis Earle, M. D.	Greenville	Do.
Greenwood	J. E. Brodie, M. D.	Greenwood	Do.
Horry	P. H. Edwards, M. D.	Conway	Do.
Kershaw	A. W. Humphries, M. D.	Camden	Do.
Newberry	Claude Sease, M. D.	Newberry	Do.
Oconee	B. F. Sloan, M. D.	Walhalla	Do.
Orangeburg	G. C. Bolin, M. D.	Orangeburg	Do.
Pickens	W. B. Furman, M. D.	Pickens	Do.
Richland	R. W. Ball, M. D.	Columbia	Do.
Spartanburg	J. M. Beeler, M. D.	Spartanburg	Do.
Tennessee:			
Blount	A. E. Hardison, M. D.	Maryville	Director.
Bradley	W. Carey Sanford, M. D.	Cleveland	Do.
Davidson	J. J. Lentz, M. D.	Nashville	Do.
Do	W. P. Parker, M. D., C. P. H.	do	Assistant director.
Gibson	F. L. Roberts, M. D., C. P. H.	Trenton	Director.
Do	Roscoe Faulkner, M. D.	do	Assistant director.
Giles	J. U. Speer, M. D.	Pulaski	Director.
Greene	R. S. Cowles, M. D.	Greeneville	Do.
Grundy	U. B. Bowden, M. D.	Pelham	Do.
Hamilton	J. C. Eldridge, M. D.	Chattanooga	Do.
Hardeman	R. L. Cobb, M. D.	Bolivar	Do.
Hardin	J. W. Erwin, M. D.	Savannah	Do.
Humphreys	J. C. Tatum, M. D.	Waverly	Do.
Knox	A. G. Hufstedler, M. D.	Knoxville	Do.
Lake	J. P. Moon, M. D.	Tiptonville	Do.
Lauderdale	R. B. Griffin, M. D.	Ripley	Do.
Lincoln	M. F. Brown, M. D., Ph. G., Phar. D., Ph. C.	Fayetteville	Do.
Maury	H. C. Busby, M. D., C. P. H.	Columbia	Do.
Monroe	D. M. Cowgill, M. D.	Madisonville	Do.
Montgomery	F. J. Malone, M. D.	Clarksville	Do.
Obion	W. B. Harrison, M. D.	Union City	Do.
Roane	J. C. Fly, M. D.	Kingston	Do.
Rutherford	J. B. Black, M. D., C. P. H., D. P. H.	Murfreesboro	Do.
Do	W. M. Dedman, M. D.	do	Assistant director.
Sevier	R. C. Kash, M. D.	Sevierville	Director.
Shelby	W. P. Moore, M. D.	Memphis	Do.
Sullivan	F. L. Moore, M. D., C. P. H.	Blountville	Do.
Do	W. F. Murphy, M. D., M. P. H.	do	Assistant director.
Sumner	H. M. Kelso, M. D., C. P. H.	Gallatin	Director.
Tipton	A. J. Butler, M. D., C. P. H.	Covington	Do.
Washington	W. L. Poole, M. D., C. P. H.	Jonesboro	Do.
Weakley	M. D. Ingram, M. D.	Dresden	Do.
Williamson	R. K. Gallaway, M. D., M. P. H.	Franklin	Do.
Wilson	B. W. Patton, M. D.	Lebanon	Do.
Districts:			
Anderson - Campbell.	C. B. Tucker, M. D., C. P. H.	Clinton	Do.
	H. S. Rule, M. D.	Jacksboro	Assistant director.
Bledsoe-Sequatchie	H. M. Roberson, M. D.	Pikesville	Director.
Carter-Unicoi	R. B. Howard, M. D., C. P. H.	Elizabethton	Do.
	J. Y. O'Daniel, M. D.	Erwin	Assistant director.
Claiborne-Grainger	A. B. Shipley, M. D.	Tazewell	Director.
Jackson-Fentress	F. B. Clark, M. D.	Gainesboro	Do.

State and county	Name of health officer	Post office	Official title
Texas:			
Cameron	William E. Spivey, M. D	San Benito	Director.
Dallas	Horace E. Duncan, M. D., C. P. H.	Dallas	Do.
El Paso-Hudspeth-Culberson.	Thomas J. McCamant, M. D.	El Paso	Do.
Gregg	Thomas B. Wilson, M. D	Longview	Assistant director.
Hidalgo	Drew R. Handley, M. D	Edinburg	Director.
Nolan	E. W. Prothro, M. D	Sweetwater	Do.
Potter	B. M. Primer, M. D., M. P.	Amarillo	Do.
Tarrant	Burke Brewster, M. D	Fort Worth	Do.
Utah:			
Davis	Sumner Gleason, M. D	Kaysville	Do.
Virginia:			
Albemarle	R. D. Hollowell, M. D H.	Charlottsville	Health officer.
Alleghany-Rockbridge	R. P. Cooke, M. D	Lexington	Do.
Arlington	P. M. Chichester, M. D	Clarendon	Do.
Augusta	H. M. Wallace, M. D	Staunton	Do.
Brunswick-Greensville-Mecklenburg.	T. H. Valentine, M. D	Lawrenceville	Do.
Buckingham-Nottoway-Prince Edward.	W. A. Brumfield, M. D	Farmville	Do.
Dickenson-Lee-Scott-Wise.	C. H. Reagan, M. D	Norton	Do.
Fairfax	E. M. Holmes, Jr., M. D	Fairfax	Do.
Halifax-Pittsylvania	D. C. Steelsmith, M. D., C. P. H.	South Boston	Do.
	W. H. Walcott, M. D	Chatham	Assistant director.
Hanover	Linwood Farley, M. D	Ashland	Do.
Henrico	J. N. Dudley, M. D	Henrico C. H	Do.
Isle of Wight-Nansemond.	Wm. F. Wild, M. D., C. P. H.	Suffolk	Do.
Montgomery	J. B. Porterfield, M. D	Christiansburg	Do.
Norfolk-Princess Anne	J. Leake, M. D	Portsmouth	Do.
Northampton	H. B. Magill, M. D	Eastville	Do.
Peninsula Health District.	Geo. E. Waters, M. D	Williamsburg	Do.
Elizabeth City.			
James City.			
Warwick.			
York.			
Southampton	P. P. Causey, M. D	Courtland	Do.
Valley Health District	S. D. Gardner, M. D	Harrisonburg	Do.
Greene.			
Madison.			
Page.			
Rappahannock.			
Rockingham.			
Shenandoah.			
Warren.			
Wythe	D. H. Andrew, M. D	Wytheville	Do.
Washington:			
Chelan	C. R. Fargher, M. D	Wenatchee	County health officer.
Clallam	Leland E. Powers, M. D	Port Angeles	Do.
Clark	Clyde H. Hutt, M. D	Vancouver	Do.
King	Wallace D. Hunt, M. D	Seattle	Do.
Snohomish	H. L. Eldridge, M. D	Everett	Do.
Spokane	A. E. Lien, M. D	Spokane	Do.
Yakima	Lloyd Moffitt, M. D	Yakima	Do.
Walla Walla	J. E. Vanderpool, M. D	Walla Walla	Do.
West Virginia:			
Berkeley	C. A. Thomas, M. D	Martinsburg	Do.
Boone	R. L. Hunter, M. D	Madison	Do.
Brooke	W. T. Booher, M. D	Wellsburg	Do.
Fayette	H. H. Puckett, M. D	Fayetteville	Do.
Hancock	T. E. Cato, M. D	New Cumberland	Do.
Harrison	A. J. Kemper, M. D	Clarksburg	Do.
Kanawha	John Thames, M. D	Charleston	Do.
Logan	T. J. Farley, M. D	Logan	Do.
Marshall	W. G. C. Hill, M. D	Moundsville	Do.
Monongalia	R. C. Farrier, M. D	Morgantown	Do.
Ohio	Reece M. Pedicord, M. D	Wheeling	Do.
Preston	C. Y. Moser, M. D	Kingwood	Do.
Raleigh	W. W. Hume, M. D	Beckley	Do.
Wood	A. D. Knott, M. D	Parkersburg	Do.

DEATHS DURING WEEK ENDED AUG. 1, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 1, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,095	7,143
Deaths per 1,000 population, annual basis	9.9	10.0
Deaths under 1 year of age	497	537
Deaths under 1 year of age per 1,000 estimated live births	45	49
Deaths per 1,000 population, annual basis, first 31 weeks of year	12.8	11.9
Data from industrial insurance companies:		
Policies in force	68,393,465	67,973,558
Number of death claims	14,038	11,361
Death claims per 1,000 policies in force, annual rate	10.7	8.7
Death claims per 1,000 policies, first 31 weeks of year, annual rate	10.4	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Aug. 8, 1936, and Aug. 10, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 8, 1936, and Aug. 10, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935
New England States:								
Maine	5				33	21	0	0
New Hampshire	1				2	2	0	0
Vermont	1					11	0	0
Massachusetts	7	6			89	32	0	1
Rhode Island					1	1	0	1
Connecticut	1	2	1		16	26	3	0
Middle Atlantic States:								
New York	17	9	[1] 2	[1] 5	223	280	11	16
New Jersey	1	6	6	3	50	41	1	1
Pennsylvania	13	29			73	76	5	2
East North Central States:								
Ohio	7	9	3	4	17	65	1	3
Indiana	8	9	4	14	1	8	3	0
Illinois	17	31	6	9	3	71	3	4
Michigan	4	14		2	8	93	2	2
Wisconsin	4	2	7	19	61	230	0	2
West North Central States:								
Minnesota	1	4	1		3	8	0	0
Iowa	3	3	2	2	3	4	4	2
Missouri	5	22	27	25		16	0	0
North Dakota	1	2		6		23	0	0
South Dakota	1	1			2		0	0
Nebraska	6	4			8	3	0	0
Kansas	6	5	1				0	0
South Atlantic States:								
Delaware					1	3	0	0
Maryland [1,3]	8	3	2	1	30	10	2	3
District of Columbia [3]	1				7		0	0
Virginia [3]	10	16			14	13	6	0
West Virginia	3	14		47	3	4	2	3
North Carolina [3]	18	14	4		5	8	1	1
South Carolina	1	3	32	42	5	8	0	0
Georgia [4]	8	8					2	0
Florida [4]	6	9	1			2	2	1
East South Central States:								
Kentucky	2	13			14	18	13	2
Tennessee	8	9	13	3	5	1	2	1
Alabama [4]	9	18	11		1	5	0	1
Mississippi [3]	10	12					0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 8, 1936, and Aug. 10, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug 8, 1936	Week ended Aug 10, 1935
West South Central States:								
Arkansas	3	8	1	4		3	0	2
Louisiana	5	9	6	4	5	2	0	0
Oklahoma [5]	4	7	11	20	1	4	0	0
Texas [4]	24	76	26	39	33	39	1	1
Mountain States:								
Montana [3]	1	4			1	8	2	0
Idaho [3]					4	3	0	0
Wyoming	1	1			1	8	0	0
Colorado	2	7			2	7	1	2
New Mexico	1	1	1	2	1	1	0	0
Arizona	3	1	7	4	28		0	1
Utah [2]		1			4		0	0
Pacific States:								
Washington					20	26	0	0
Oregon [3]		1	4	2	6	44	1	0
California	17	9	8	2	67	99	2	7
Total	254	402	187	268	851	1,336	70	60
First 32 weeks of year	14,796	17,719	141,500	103,767	269,437	694,433	5,902	4,087

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug 8, 1936	Week ended Aug 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935
New England States:								
Maine	0	1	4	6	0	0	1	1
New Hampshire	0	5	1	2	0	0	1	1
Vermont	1	0		1	0	0	0	1
Massachusetts	2	74	46	35	0	0	4	3
Rhode Island	0	8	5	1	0	0	2	0
Connecticut	1	22	8	11	0	0	1	1
Middle Atlantic States:								
New York	8	158	111	100	0	0	13	29
New Jersey	0	13	14	13	0	0	4	6
Pennsylvania	3	8	111	56	0	0	22	10
East North Central States:								
Ohio	4	1	42	50	0	0	4	15
Indiana	1	1	23	12	0	0	7	6
Illinois	11	13	111	131	1	0	19	30
Michigan	3	14	76	47	0	0	6	9
Wisconsin	0	1	78	52	8	4	2	0
West North Central States:								
Minnesota	0	0	22	26	1	1	1	14
Iowa	1	0	27	16	1	7	3	4
Missouri	8	1	15	10	1	0	26	30
North Dakota	0	0	8	4	0	0	0	1
South Dakota	0	0	20		0	1	0	0
Nebraska	0	0	8	4	0	2	0	0
Kansas	0	2	31	17	1	1	4	16
South Atlantic States:								
Delaware	0	1	2	1	0	0	1	1
Maryland [2] [3]	1	4	10	10	0	0	8	19
District of Columbia [3]	0	4	1	5	0	0	1	2
Virginia [3]	2	68	15	7	0	0	35	45
West Virginia	2	6	9	21	0	0	11	28
North Carolina [3]	2	26	13	15	1	0	45	88
South Carolina	2	4		5	0	0	18	20
Georgia [4]	6	1	5	7	0	0	25	23
Florida [4]	0	2	2	3	0	0	3	1
East South Central States:								
Kentucky	4	15	7	15	1	0	42	86
Tennessee	26	1	3	7	0	0	40	71
Alabama [4]	26	1	8	5	0	0	36	13
Mississippi [3]	12	0	5	7	0	0	17	10

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 8, 1936, and Aug. 10, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935	Week ended Aug. 8, 1936	Week ended Aug. 10, 1935
West South Central States:								
Arkansas	0	2	5		0	2	15	51
Louisiana	1	5	17	4	0	0	39	14
Oklahoma [5]	0	0	10	8	0	0	49	57
Texas [4]	0	1	17	40	1	3	87	57
Mountain States:								
Montana [3]	0	0	3	1	8	0	2	3
Idaho [3]	1	0	7	4	1	0	1	0
Wyoming	0	0	9	4	2	0	0	1
Colorado	0	2	11	13	0	2	2	1
New Mexico	0	0	5		0	0	7	3
Arizona	0	0	1	1	0	0	4	1
Utah [2]	0	0	4	13	3	0	1	0
Pacific States:								
Washington	5	1	18	18	0	5	3	0
Oregon [3]	1	0	7	17	0	1	5	3
California	9	20	61	53	1	4	17	9
Total	138	486	1,016	878	26	33	634	732
First 32 weeks of year	1,220	2,801	182,973	179,431	6,204	5,290	6,333	8,518

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Aug. 8, 1936, 19 cases, as follows: Maryland, 1; District of Columbia, 2; Virginia, 8; North Carolina, 5; Montana, 1; Idaho, 1; Oregon, 1.
[4] Typhus fever, week ended August 8, 1936, 45 cases, as follows: Georgia, 24; Florida, 6; Alabama, 9; Texas, 6.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1936										
Arkansas	1	17	21	258	4	46	0	9	0	72
Connecticut	1	3	2	1	172		2	42	0	10
District of Columbia	5	44	1		165		0	15	0	5
Indiana	6	41	48	1	24		4	127	2	20
Iowa	2	15		5	13		1	145	48	5
Maine	1	2		1	367		7	30	0	3
Nebraska	3	15			24		0	62	19	3
North Carolina	14	51	2		31	125	6	57	1	84
Pennsylvania	19	108		3	1,451	1	5	807	0	54

July 1936

	Cases
Anthrax:	
Pennsylvania	2
Chicken pox:	
Arkansas	11
Connecticut	137
District of Columbia	11
Indiana	24
Iowa	26
Maine	84
Nebraska	17
Pennsylvania	749
Conjunctivitis:	
Connecticut	26

July 1936—Continued

	Cases
Dysentery:	
Connecticut (amoebic)	1
Maine (bacillary)	1
Pennsylvania (amoebic)	
Epidemic encephalitis:	
Connecticut	1
District of Columbia	1
Indiana	1
Maine	1
Pennsylvania	1

July 1936—Continued

	Cases
German measles:	
Connecticut	170
Maine	17
Pennsylvania	353
Lead poisoning:	
Connecticut	1
Mumps:	
Arkansas	47
Connecticut	146
Indiana	26
Iowa	44
Maine	133

Summary of Monthly Reports from States—Continued

July 1936—Continued

	Cases
Mumps—Continued.	
Nebraska	31
Pennsylvania	556
Ophthalmia neonatorum:	
Pennsylvania	5
Paratyphoid fever:	
Connecticut	1
Iowa	2
Rabies in animals:	
Connecticut	-
Indiana	-
Rocky Mountain spotted fever:	
District of Columbia	1
Pennsylvania	2
Septic sore throat:	
Connecticut	10
Nebraska	10
Tetanus:	
Connecticut	2
Maine	1
Pennsylvania	1
Trachoma:	
Connecticut	1
Trichinosis:	
Connecticut	1
Undulant fever:	
Arkansas	9
Connecticut	17
Indiana	1
Undulant fever—Contd.	
Iowa	6
Maine	1
Pennsylvania	8
Vincent's infection:	
Maine	-
Whooping cough:	
Arkansas	4
Connecticut	245
District of Columbia	152
Indiana	115
Iowa	81
Maine	63
Nebraska	22
Pennsylvania	1,462

PLAGUE INFECTION IN PARASITES FROM MARMOTS IN MONTANA AND IN A MARMOT IN UTAH

Plague infection has been found in fleas and lice taken from marmots July 25, 1936, in Beaverhead County, Mont., and in a marmot killed July 31, 1936, in Beaver County, Utah. For details see page 1159.

CASES OF VENEREAL DISEASES REPORTED FOR MAY 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,042	3.85	339	1.25
Arizona	32	.70	85	1.86
Arkansas	194	1.03	116	.62
California	1,071	1.74	965	1.57
Colorado [1]				
Connecticut	240	1.45	96	.58
Delaware	88	3.64	50	2.07
District of Columbia [2]				
Florida [2]				
Georgia	1,080	3.71	505	1.73
Idaho	0		0	
Illinois	1,213	1.54	968	1.23
Indiana	98	.30	76	.23
Iowa [3]	117	.47	138	.56
Kansas	91	.48	56	.29
Kentucky	166	.62	207	.78
Louisiana	104	.48	78	.36
Maine	53	.66	42	.52
Maryland	673	4.03	172	1.03
Massachusetts	446	1.03	441	1.02
Michigan	473	.93	516	1.01
Minnesota	362	1.39	255	.98
Mississippi	1,219	5.93	1,875	9.12
Missouri	480	1.31	189	.51
Montana [3]	73	1.36	28	.52
Nebraska	27	.19	57	.41
Nevada [1]				
New Hampshire	15	.32	16	.34
New Jersey	465	1.10	202	.48
New Mexico	23	.53	19	.43
New York	7,419	5.68	1,816	1.39
North Carolina	1,480	4.48	447	1.35
North Dakota	7	.10	41	.60
Ohio [3]	728	1.06	272	.40

See footnotes at end of table.

Cases of venereal diseases reported for May 1936—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Oklahoma [3]	256	1.03	211	.85
Oregon	35	.35	123	1.24
Pennsylvania [4]	294	.30	177	.18
Rhode Island	112	1.59	46	.65
South Carolina	328	1.87	402	2.30
South Dakota	8	.11	25	.35
Tennessee	960	3.59	520	1.94
Texas	591	.97	167	.27
Utah [1]				
Vermont	21	.58	21	.58
Virginia	540	2.21	270	1.10
Washington	136	.85	208	1.29
West Virginia	185	1.04	109	.61
Wisconsin [5]	14	.05	96	.32
Wyoming [1]				
Total	22,959	1.86	12,442	1.01

Reports from cities of 200,000 population or over

Akron, Ohio	14	.52	11	.41
Atlanta, Ga.[2]				
Baltimore, Md	365	4.42	93	1.13
Birmingham, Ala	139	4.92	76	2.69
Boston, Mass	182	2.30	171	2.16
Buffalo, N. Y.[2]				
Chicago, Ill	457	1.28	299	.84
Cincinnati, Ohio [2]				
Cleveland, Ohio	152	1.63	75	.81
Columbus, Ohio	47	1.54	21	.69
Dallas, Tex.[2]				
Dayton, Ohio [2]				
Denver, Colo.[2]				
Detroit, Mich.[2]				
Houston, Tex.[2]				
Indianapolis, Ind	33	.87	41	1.09
Jersey City, N. J	1	.03	2	.06
Kansas City, Mo	53	1.26	8	.19
Los Angeles, Calif	398	2.78	313	2.19
Louisville, Ky.[2]				
Memphis, Tenn	213	7.98	67	2.51
Milwaukee, Wis	5	.08	19	.31
Minneapolis, Minn	106	2.18	115	2.36
Newark, N. J	227	4.90	76	1.64
New Orleans, La.[2]				
New York, N. Y	5,863	8.03	1,281	1.75
Oakland, Calif	40	1.32	39	1.29
Omaha, Nebr	5	.23	12	.54
Philadelphia, Pa	285	1.43	43	.22
Pittsburgh, Pa	69	1.01	24	.35
Portland, Oreg.[2]				
Providence, R. I	67	2.50	26	1.00
Rochester, N. Y.[2]				
St. Louis, Mo	110	1.32	87	1.04
St. Paul, Minn	37	1.31	29	1.03
San Antonio, Tex.[1]				
San Francisco, Calif	133	1.98	146	2.18
Seattle, Wash	96	2.53	144	3.79
Syracuse, N. Y	75	3.44	27	1.24
Toledo, Ohio	53	1.74	23	.76
Washington, D. C.[2]				

1 Not reporting.
2 No report for current month.
3 Incomplete.
4 Includes only those cases that enter the clinics conducted by the State department of health.
5 Only cases of syphilis in the infectious stage are reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 1, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Maine:											
Portland	0		0	0	3	0	0	0	0	11	17
New Hampshire:											
Concord	0		0	0	1	1	0	0	0	0	12
Nashua	0			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	0	0	0	0	0	1	1	6
Rutland	0		0	0	1	2	0	0	0	9	5
Massachusetts:											
Boston	3		1	35	15	17	0	11	0	56	184
Fall River	2		0	2	0	2	0	0	0	0	23
Springfield	0		0	0	0	2	0	2	0	1	28
Worcester	0		0	4	2	2	0	0	0	15	44
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	
Providence	0		0	2	1	1	0	2	0	13	74
Connecticut:											
Bridgeport	0		0	3	2	1	0	0	0	3	20
Hartford	0		0	0	2	0	0	0	0	3	35
New Haven	0		0	0	0	0	0	0	0	16	21
New York:											
Buffalo	0		0	27	4	8	0	10	1	8	137
New York	22	1	1	112	44	23	0	82	5	124	1,143
Rochester	0		0	1	7	2	0	0	0	5	67
Syracuse	0		0	5	0	4	0	0	0	9	22
New Jersey:											
Camden	0		0	1	0	0	0	0	1	3	23
Newark	0		0	10	7	3	0	4	1	20	76
Trenton	0		0	0	1	1	0	1	0	4	27
Pennsylvania:											
Philadelphia	0		0	14	9	19	0	24	4	85	365
Pittsburgh	0		3	1	4	11	0	7	0	88	142
Reading	0		0	1	0	0	0	0	1	8	19
Scranton	0			0		0	0		0	0	
Ohio:											
Cincinnati	2		0	4	4	2	0	10	1	0	110
Cleveland	4	3	1	8	5	10	0	8	2	74	164
Columbus	0		0	3	2	1	0	5	0	11	60
Toledo	0		0	0	1	6	0	6	0	40	78
Indiana:											
Anderson	0		0	0	3	4	0	0	0	4	7
Fort Wayne	0		0	0	1	3	0	1	0	0	21
Indianapolis	0		0	0	11	2	0	5	1	6	80
South Bend	0		0	0	1	0	0	0	0	2	12
Terre Haute	1		0	0	0	0	0	0	0	0	22
Illinois:											
Alton	0		0	0	1	0	0	1	0	1	14
Chicago	5	1	1	3	18	54	0	34	2	129	548
Elgin	1		0	0	0	0	0	0	0	6	4
Moline	0		0	0	0	0	0	0	0	4	3
Springfield	0		0	0	0	0	0	0	0	0	13
Michigan:											
Detroit	1		0	4	10	22	0	10	2	165	212
Flint	0		0	0	1	2	0	3	0	6	20
Grand Rapids	0		0	0	0	1	0	0	1	3	30
Wisconsin:											
Kenosha	0		0	0	0	0	0	0	0	1	5
Milwaukee	0	1	1	3	5	16	0	0	1	46	82
Racine	0		0	0	0	1	0	0	0	0	8
Superior	0		0	0	0	2	0	0	0	0	6
Minnesota:											
Duluth	0		0	3	2	6	0	3	0	6	22
Minneapolis	0		0	2	2	3	0	1	0	7	80
St. Paul	0		0	2	3	0	0	1	0	9	57
Iowa:											
Cedar Rapids	1			0		0	0		0	5	
Davenport	0			0		0	0		0	0	
Des Moines	0			0		0	0		0	0	31
Sioux City											
Waterloo	0			0		1	0		0	0	

City reports for week ended Aug. 1, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	0		0	1	3	5	0	1	0	1	98
St. Joseph											
St. Louis	2	1	0	1	4	7	0	6	3	25	137
North Dakota:											
Fargo	0		0	1	0	0	0	0	0	0	7
Grand Forks	0			0		0	0		0	0	
Minot	0		0	2	0	0	0	0	0	0	4
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Nebraska:											
Omaha	4		0	2	5	1	0	0	0	1	85
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	0	4
Topeka											
Wichita	0		0	0	4	1	0	0	0	1	24
Delaware:											
Wilmington	0		0	0	0	0	0	1	0	0	19
Maryland:											
Baltimore	2		0	27	6	6	0	8	4	103	167
Cumberland	0		0	1	2	0	0	1	0	0	17
Frederick	0		0	0	0	0	0	0	0	0	0
District of Col.:											
Washington	5		0	20	2	1	0	9	1	33	143
Virginia:											
Lynchburg	0		0	0	1	0	0	0	0	6	13
Norfolk	0		0	0	3	0	0	0	0	0	26
Richmond	0		0	0	1	1	0	6	0	0	58
Roanoke	0		0	0	0	0	0	1	1	0	12
West Virginia:											
Charleston	0		0	0	0	0	0	0	1	0	18
Huntington	0			0		1	0		0	0	
Wheeling	0		0	3	1	0	0	1	0	0	25
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh	0		0	0	1	0	0	2	0	0	22
Wilmington	0		0	0	0	0	0	0	0	0	6
Winston-Salem	1		0	0	2	2	0	2	1	0	13
South Carolina:											
Charleston	0	1	0	0	4	0	0	1	0	0	33
Columbia											
Florence	0		0	0	1	0	0	0	0	0	14
Greenville	0		0	1	0	1	0	1	0	0	8
Georgia:											
Atlanta	1	1	0	0	2	2	0	7	3	0	81
Brunswick											
Savannah	2		0	0	0	0	0	3	2	1	25
Florida:											
Miami	0	1	0	1	1	2	0	3	1	1	33
Tampa	1		0	0	2	0	0	0	0	1	19
Kentucky:											
Ashland	0		1	0	2	0	0	0	1	0	32
Covington	0		0	0	0	0	0	0	0	0	9
Lexington	0		0	0	1	0	0	1	0	0	21
Tennessee:											
Knoxville	0	1	1	0	1	0	0	3	3	0	33
Memphis	1		0	0	4	0	0	8	0	9	89
Nashville	0		0	1	3	0	0	4	2	0	55
Alabama:											
Birmingham	0		0	0	1	0	0	3	1	2	76
Mobile	0		0	1	1	0	0	2	0	0	10
Montgomery	0			0		0	0		1	0	
Arkansas:											
Fort Smith											
Little Rock	0		0	0	4	0	0	3	0	0	9
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	3
New Orleans	5	2	1	4	11	0	0	9	1	26	139
Shreveport	0		0	0	3	0	0	2	10	0	30
Oklahoma:											
Oklahoma City	1		0	0	2	2	0	2	2	0	37
Tulsa	0			0		0	0		1	0	

City reports for week ended Aug. 1, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	3	------	0	2	1	2	0	3	2	3	63
Fort Worth	1	------	0	1	0	0	0	2	0	0	31
Galveston	0	------	0	0	1	1	0	1	0	0	13
Houston	3	------	0	0	3	0	1	4	3	1	85
San Antonio	0	------	0	0	3	0	0	6	0	0	59
Montana:											
Billings	0	------	0	1	0	0	0	0	0	0	7
Great Falls	0	------	0	0	2	0	0	0	0	3	7
Helena	0	------	0	0	0	1	0	0	0	0	4
Missoula	1	------	0	0	1	0	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	0	0	0	1	0	0	11
Colorado:											
Colorado Springs	0	------	0	1	0	4	0	1	0	0	7
Denver	2	------	0	4	5	0	1	3	0	37	9
Pueblo	0	------	0	0	0	4	0	0	0	1	10
New Mexico:											
Albuquerque	0	------	0	0	1	0	0	2	1	0	9
Utah:											
Salt Lake City	0	------	0	8	5	4	0	2	1	24	42
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	12	4	3	0	5	1	9	85
Spokane	0	------	0	0	1	3	0	0	0	8	34
Tacoma	0	------	0	0	2	0	0	1	0	2	23
Oregon:											
Portland	0	------	0	0	4	3	0	3	0	1	80
Salem	0	------	------	1	------	1	0	------	1	2	------
California:											
Los Angeles	3	10	1	16	12	10	0	22	1	56	306
Sacramento	0	------	0	0	0	6	0	0	1	16	23
San Francisco	0	------	0	5	5	14	0	10	1	8	152

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
New Hampshire:			
Concord	0	0	1
Massachusetts:			
Boston	2	0	1
New York:			
Buffalo	1	0	0
New York	4	3	2
Rochester	0	0	1
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	0	1	0
Pittsburgh	1	1	1
Ohio:			
Cincinnati	1	0	2
Cleveland	2	1	0
Illinois:			
Chicago	1	1	3
Michigan:			
Detroit	1	0	1
Minnesota:			
Minneapolis	1	0	1
St. Paul	0	0	1
North Dakota:			
Minot	0	0	2
Maryland:			
Baltimore	1	1	1

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
District of Columbia:			
Washington	1	0	0
Virginia:			
Roanoke	0	0	1
Tennessee:			
Memphis	0	0	1
Nashville	0	0	1
Alabama:			
Birmingham	0	0	5
Louisiana:			
Shreveport	0	2	0
Oklahoma:			
Tulsa	1	0	0
Texas:			
Galveston	1	1	0
Montana:			
Missoula	0	0	1
Colorado:			
Denver	1	0	0
Washington:			
Seattle	0	1	0
Spokane	0	0	1
Oregon:			
Portland	0	0	1
California:			
Los Angeles	2	1	4
San Francisco	0	0	1

Epidemic encephalitis.—Cases: Pittsburgh, 1; St. Louis, 1.

Pellagra.—Cases: Boston, 2; Wilmington, N. C., 3; Winston-Salem, 1; Savannah, 2; Birmingham, 1, New Orleans, 2; Dallas, 1; San Francisco, 1.

Rabies in man.—Deaths: New York, 1.

Typhus fever.—Cases: Norfolk, 1; Atlanta, 1; Savannah, 3; Miami, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended July 25, 1936.—During the 2 weeks ended July 25, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Bruns-wick	Quebec	Onta-rio	Mani-toba	Sas-katch-ewan	Alber-ta	British Colum-bia	Total
Cerebrospinal meningitis			1	4						5
Chicken pox		6	2	87	211	32	68	29	18	453
Diphtheria		6	2	30	8	13	3	1	1	64
Dysentery				1	10					11
Erysipelas				1	5	5		6	3	20
Influenza									7	7
Measles		12	6	173	487	48	17	32	92	867
Mumps					134	12	6	4	28	184
Paratyphoid fever		1			2					3
Pneumonia	2				8		1		15	26
Poliomyelitis			1	1	2	3			2	9
Scarlet fever	1	6	9	71	122	21	16	53	20	319
Smallpox							2			2
Trachoma					1				1	2
Tuberculosis	6	69	41	120	94	22	12	3	43	410
Typhoid fever	1	4	8	33	8	3	3	2	1	63
Undulant fever				2	1					3
Whooping cough	10	5	2	135	232	14	3	16	38	455

PANAMA CANAL ZONE

Communicable diseases—April–June 1936.—During the months of April, May, and June 1936, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	April		May		June	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chicken pox	12		5		1	
Diphtheria	11		8		5	
Dysentery (amoebic)	26		39	2	42	1
Dysentery (bacillary)	5		4		2	1
Leprosy	1					1
Malaria	80	2	115		267	
Measles	6		7		1	
Mumps	2				1	
Paratyphoid fever	1	1				
Pneumonia		20		28		20
Relapsing fever	1					
Trachoma						1
Tuberculosis		34		31		33
Typhoid fever	1		1		2	
Typhus fever					2	
Whooping cough	6		5		6	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for July 31, 1936, pages 1053–1067. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued August 28, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina.—According to information dated August 5, 1936, plague was reported in Argentina as follows: Tartagal, Salta Province, 4 cases; Taco Ralo, Tucuman Province, 1 case.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau.—A rat found August 9, 1936, in Paauhau, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague-infected.

United States.—Reports of plague infection in Montana and Utah appear on pages 1159 and 1160.

Smallpox

Argentina—Jujuy Province—Ingenio Esperanza.—Information dated August 5, 1936, states that 6 cases of smallpox were reported at Ingenio Esperanza, Jujuy Province, Argentina.

Mexico.—During the month of May 1936 smallpox was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 2 cases, 1 death; Guadalajara, Jalisco State, 37 cases, 26 deaths; Toluca, Mexico State, 4 cases, 4 deaths; Tijuana, Lower California, 1 case; Mexico, D. F., 26 cases, 8 deaths; Puebla, Puebla State, 2 cases.

Typhus Fever

Mexico.—During the month of May 1936 typhus fever was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 5 cases, 2 deaths; Mexico, D. F., 26 cases, 15 deaths; Toluca, Mexico State, 6 cases, 2 deaths; Puebla, Puebla State, 3 cases, 2 deaths; Queretaro, Queretaro State, 1 case; San Luis Potosi, San Luis Potosi State, 3 cases.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PREVALENCE OF DISEASE

PUBLIC HEALTH REPORTS

VOL. 51 AUGUST 28, 1936 NO. 35

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

July 12–August 8, 1936

Poliomyelitis.—The outbreak of poliomyelitis that began in Alabama during the early part of July has apparently been confined to that State and adjoining States in the East South Central region. For the 4 weeks ended August 8, Alabama reported 129 cases; Tennessee, 99; Mississippi, 32; and Kentucky, 11—more than one-half of the total cases occurred in those 4 States. No other State or region reported more than the usual increase that is expected at this season of the year.

The total number of cases reported for the country as a whole was 515, which was about 35 percent of that reported for the corresponding period in 1935. In that year an epidemic that started in North Carolina reached its peak in the South Atlantic region during this period and had spread into States along the North Atlantic seaboard. In 1934 the cases totaled 1,035 as a result of an epidemic in California and other Western States. In 1933 a minor epidemic was in progress about this time of the year in the North Atlantic regions and a total of 667 cases was reported, while in 1931 a much more severe epidemic was present in the same regions and there were 2,974 cases reported. In 1929 and 1932 the cases for this period totaled 314 and 395, respectively.

The summer rise of poliomyelitis in recent years has reached its peak about the third week in September. This year each region reported the usual increase in this period over the preceding period, but the figures compare favorably with those for this season in recent years when an epidemic was not in progress.

Scarlet fever.—The number of cases of scarlet fever declined about 50 percent from the total for the preceding 4-week period. The incidence (4,442 cases) stood at approximately the same level as last

[1] From the Office of Statistical Investigations, U S. Public Health Service. These summaries include only the eight important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The numbers of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48, scarlet fever, 48. influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

year, but it was more than 20 percent above the average for the corresponding period in the years 1930–34, inclusive. Sharp decreases from the preceding period were reported from the West North Central and Mountain and Pacific regions, where the disease has been most prevalent, but in the former region the number of cases was about 35 percent above the high level of last year, while in the latter regions it stood at about last year's level. The incidence in those regions has been the highest in the 8 years for which these data are available. Other regions reported a gradual decline toward the seasonal low level which is usually reached at this season of the year.

Diphtheria.—The incidence of diphtheria continued at a low level. For the 4 weeks ended August 8 the cases totaled 1,111, which was about 80 percent of the number reported for the corresponding period in each of the 2 preceding years. Maine, with 7 cases as against 1 last year, and New York with 110 as against 55, placed the incidence in the North Atlantic regions about 10 percent above that for these States last year. In all other regions the number of cases was the lowest reported for this period in recent years.

Typhoid fever.—During the current 4-week period 2,058 cases of typhoid fever were reported, as compared with 2,895 last year and 3,760 in 1934. The current figures represented about 60 percent increase over the preceding 4-week period, but the incidence normally increases sharply at this season. For the country as a whole, the number of cases was the lowest for this period in the 8 years for which these data are available. The situation was very favorable in all sections of the country. The Mountain and Pacific regions reported a slight increase over last year, and the New England and Middle Atlantic sections approximately the same incidence as last year, but in all other regions very significant decreases occurred.

Smallpox.—This disease, which has been unusually prevalent in the Mountain, Pacific, and North Central regions, has dropped to about the normal seasonal expectancy; during the current period the incidence for the country as a whole (239 cases) was at approximately the average for recent years. Of the total cases for this period, Montana reported 60; Illinois and Iowa, 38 each; Wisconsin, 24; Missouri and North Dakota, 10 each; and South Dakota and Nebraska, 8 each; more than 80 percent of the total occurred in those 8 States and no other State reported more than 6 cases. In other regions the incidence was somewhat below the seasonal expectancy.

Measles—The number of cases of measles dropped from approximately 24,000 for the preceding 4-week period to 6,488 for the 4 weeks ended August 8. The number was less than 60 percent of that for the corresponding period in 1935 and about 65 percent of the

figure for 1934. The current incidence was about 10 percent below the average for the years 1929–33, inclusive, which is a better comparison as the years 1935 and 1934 were both unusually high "measles years."

Influenza.—For the current period the cases of influenza totaled 727, as against 987, 1,354, and 1,043 for the corresponding period in the years 1935, 1934, and 1933, respectively. In all sections of the country the incidence during this period was about at the normal seasonal level.

Meningococcus meningitis.—During the current 4-week period the incidence of meningococcus meningitis (287 cases) stood at about the same level as in the corresponding period in 1935. During this period in 1934 and 1933 there were 130 and 147 cases, respectively. In the South Atlantic, South Central, and Mountain and Pacific regions the disease was slightly more prevalent than last year, but in other regions fewer cases were reported. States reporting cases somewhat above the seasonal expectancy were Kentucky (36), New York (35), California and Illinois (21 each), Virginia (18), Pennsylvania (16), and Maryland and West Virginia (10 each).

Mortality, all causes.—The average mortality rate from all causes in large cities for the 4 weeks ended August 8, as reported by the Bureau of the Census, was 11.9 per thousand inhabitants (annual basis). The rates for the separate weeks of the period were 17.0, 11.0, 9.9, and 9.7. The rate for the week ending July 18 was probably the highest weekly death rate on record for this season of the year; in the following weeks the rates dropped sharply and were more nearly normal.

The sharp increase in the death rate was without doubt due to the extreme heat in the Midwestern States. An examination of the data for the group of 86 large cities shows that during the week of July 18 the death rate in a number of cities was more than five times the normal expectancy. The Weekly Health Index for the week ended July 18 states that "from the standpoint of mortality the heat wave of 1936 is much more severe than the heat wave of 1934." The highest weekly rate for approximately the same 86 cities in 1934 was reported for the week ended July 28 when the rate was 12.3 and the death rates in some cities were twice the expected rates for this season of the year.[2]

The cities of the northern States of the North Central regions showed the greatest excess mortality, particularly those of Minnesota, Wisconsin, and Michigan. The cities most affected in the 1934 heat wave were farther south, particularly in Missouri, Kansas, Nebraska, and Iowa.

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[2] See Collins, Selwyn D., and Gover, Mary· Maximum temperatures and increased death rates in the drought area, 1934. Public Health Reports, Aug. 31, 1934, p. 1015.

TIME CHANGES IN THE RELATIVE MORTALITY FROM AUTOMOBILE ACCIDENTS AMONG CHILDREN IN DIFFERENT GEOGRAPHIC REGIONS OF THE UNITED STATES, 1925–1932 [1]

Studies on the Fatal Accidents of Childhood No. 2

By WILLIAM M. GAFAFER, *Senior Statistician, United States Public Health Service*

In the previous paper (*1*) of the series the mortality from automobile accidents during the year 1930 was investigated among children in different geographic regions of the United States. It is purposed in this, the second paper, to study certain time changes in the geographic distribution of mortality from the same cause among children of the United States. As in the previous paper, the mortality data are specific for single years of age under 5, and for the age groups 5–9 and 10–14. The period of time extends from 1925 through 1932. The time period, for which comparable figures are available in published volumes of the Bureau of the Census, and the particular grouping of the older ages are so taken for practical reasons. In the absence of accurate annual population enumerations, the mortality from automobile accidents is measured in terms of relative mortality; that is, in terms of the ratio of the number of fatalities from automobile accidents to the number of fatalities from all accidents. In addition, mortality from automobile accidents is related to the number of registered automobiles and to the number of gallons of gasoline consumed.

For the purposes of this paper the death registration States of 1925, consisting of 40 States and the District of Columbia, have been divided into 4 broad groups, each constituting a geographic region, as follows: A Northeastern (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the District of Columbia), a North Central (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, West Virginia, and Wisconsin), a Southeastern (Alabama, Florida, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia) and a Western (California, Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming).

Tables 1 and 1–A, which present the essential data of the study, give the number of deaths from automobile accidents per 100 deaths from all accidents and the number of deaths from automobile accidents for children under 15 years of age, white and colored combined, in different geographic regions of the United States from 1925 through 1932.

[1] From the Office of Child Hygiene Investigations, United States Public Health Service. Acknowledgment is made to the Bureau of Public Roads, United States Department of Agriculture, for supplying by State and by year the number of automobiles registered, and the number of gallons of gasoline consumed by automobiles.

Table 1.—*Number of deaths from automobile accidents per 100 deaths from all accidents among children under 15 years of age in different geographic regions of the United States, by age, 1925–32, white and colored combined*

Year	Age in years: All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
NORTHEASTERN									
1925	31.5	3.6	5.6	13.2	26.1	36.4	16.7	49.5	35.0
1926	33.1	4.4	4.3	16.5	31.1	36.7	18.1	52.5	35.4
1927	36.0	6.2	9.8	16.3	37.4	39.5	22.5	52.8	36.2
1928	35.1	6.9	8.5	17.5	33.8	40.7	21.5	51.4	35.8
1929	36.6	3.8	8.1	24.3	37.5	45.2	24.1	51.7	36.9
1930	26.0	6.1	9.3	16.7	26.8	29.6	18.4	33.7	26.1
1931	26.3	4.7	9.8	16.9	27.0	30.5	19.0	34.0	26.1
1932	25.3	3.7	11.6	16.0	26.4	32.2	19.3	30.9	26.3
NORTH CENTRAL									
1925	26.3	5.0	8.2	11.4	23.4	31.8	14.5	45.0	26.8
1926	28.0	6.2	7.1	12.2	24.1	34.9	14.7	47.5	30.9
1927	29.9	7.9	10.1	14.1	26.5	37.7	17.6	48.3	31.8
1928	31.0	6.7	10.6	16.9	34.3	38.9	19.6	48.2	33.1
1929	31.6	6.7	11.5	19.8	30.9	39.1	19.4	48.9	33.9
1930	23.4	7.8	12.3	15.9	24.7	28.7	17.0	30.8	24.3
1931	23.8	8.3	11.1	14.9	24.0	31.4	17.4	31.9	24.1
1932	21.3	5.3	8.2	15.3	23.8	24.2	14.5	29.3	22.4
SOUTHEASTERN									
1925	14.7	3.8	4.1	9.4	11.0	21.1	8.5	25.9	19.2
1926	14.6	3.0	3.4	8.0	10.9	20.3	7.7	26.3	19.4
1927	16.4	3.0	6.4	6.4	13.0	23.2	8.9	29.1	20.2
1928	16.8	3.5	3.5	8.6	17.9	21.9	9.3	27.3	23.5
1929	19.8	4.5	7.5	8.9	19.5	24.3	11.4	33.3	23.6
1930	15.8	2.8	6.4	10.5	14.5	18.8	9.4	23.5	19.5
1931	16.2	4.2	5.4	10.6	14.1	17.3	9.3	25.5	18.2
1932	14.7	2.8	6.1	11.0	16.9	18.4	9.8	22.0	15.6
WESTERN									
1925	24.8	6.7	12.1	14.1	23.3	39.5	16.9	38.0	27.4
1926	25.6	10.1	10.1	10.6	23.4	43.2	16.3	40.6	25.1
1927	27.0	9.3	13.0	16.7	29.2	34.5	18.8	38.3	30.4
1928	28.6	7.0	11.6	22.4	30.1	32.5	19.6	39.7	31.0
1929	30.2	9.7	19.3	19.5	28.2	37.0	20.9	40.9	37.1
1930	22.7	8.3	12.1	16.3	26.3	28.0	17.1	29.9	23.6
1931	23.6	8.9	12.9	19.2	21.8	26.3	16.9	31.5	25.4
1932	20.0	7.6	11.7	14.7	23.5	22.1	15.0	27.9	20.1

Table 1–A.—*Number of deaths from automobile accidents among children under 15 years of age in different geographic regions of the United States, by age, 1925–32, white and colored combined*

NORTHEASTERN

Year	Age in years: All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	1,888	22	31	63	141	204	461	1,007	420
1926	1,917	27	23	81	163	191	485	1,024	408
1927	1,992	30	43	79	198	196	546	1,034	412
1928	1,939	34	38	77	160	193	502	975	462
1929	1,908	18	33	97	165	220	533	925	450
1930	1,741	32	38	82	148	167	467	856	418
1931	1,775	22	45	85	161	195	508	857	410
1932	1,507	15	48	60	134	177	434	673	400

TABLE 1–A.—*Number of deaths from automobile accidents among children under 15 years of age in different geographic regions of the United States, by age, 1925–32 white and colored combined*—Continued

NORTH CENTRAL

Year	Age in years								
	All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	1,528	85	51	56	117	143	402	772	354
1926	1,561	48	41	59	108	136	392	775	394
1927	1,678	55	60	69	125	164	473	802	403
1928	1,700	45	64	75	163	169	516	760	424
1929	1,753	45	67	95	139	156	502	810	441
1930	1,680	58	77	91	141	152	519	738	423
1931	1,610	53	68	79	122	170	492	707	411
1932	1,260	30	47	71	109	102	359	547	354

SOUTHEASTERN

Year	All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	540	25	16	34	39	62	176	221	143
1926	560	20	15	31	37	62	165	246	149
1927	602	18	28	21	43	66	176	272	154
1928	616	23	14	29	56	61	183	253	180
1929	690	24	28	29	59	65	205	305	180
1930	656	17	24	38	53	56	188	283	185
1931	642	22	21	36	43	50	172	292	178
1932	559	15	21	34	54	51	175	233	151

WESTERN

Year	All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	386	13	26	22	27	47	135	155	96
1926	399	19	20	13	30	35	117	187	95
1927	447	18	24	29	40	41	152	179	116
1928	471	13	20	33	41	37	144	205	122
1929	471	18	39	30	29	44	160	169	142
1930	446	18	21	30	41	38	148	182	116
1931	482	19	26	30	38	36	140	195	138
1932	365	15	25	21	40	23	124	148	93

RELATIVE MORTALITY BY AGE, SPECIFIC FOR REGION

With the use of data given in table 1, figure 1 shows the time changes in the relative mortality from automobile accidents from 1925 through 1932, by age, for the different geographic regions. The figure thus shows how the relative mortality at the different ages compares in the same region. It will be observed that the range of the percentages for the Northeastern region has for its minimum, 3.6, and for its maximum, 52.8. The North Central region ranges from 5.0 to 48.9, the Southeastern from 2.8 to 33.3, and the Western from 6.7 to 39.5. The range for the Northeastern region is greatest (49.2), and this is immediately followed by the North Central (43.9). The ranges for the Southeastern (30.5) and the Western (32.8) are of similar magnitude, the latter beginning at a higher level. It will be observed, also, that for the different years the order of the ages in the different regions with respect to relative mortality is remarkably similar, the age group 5 to 9 generally leading and ages under 1 consistently lowest.

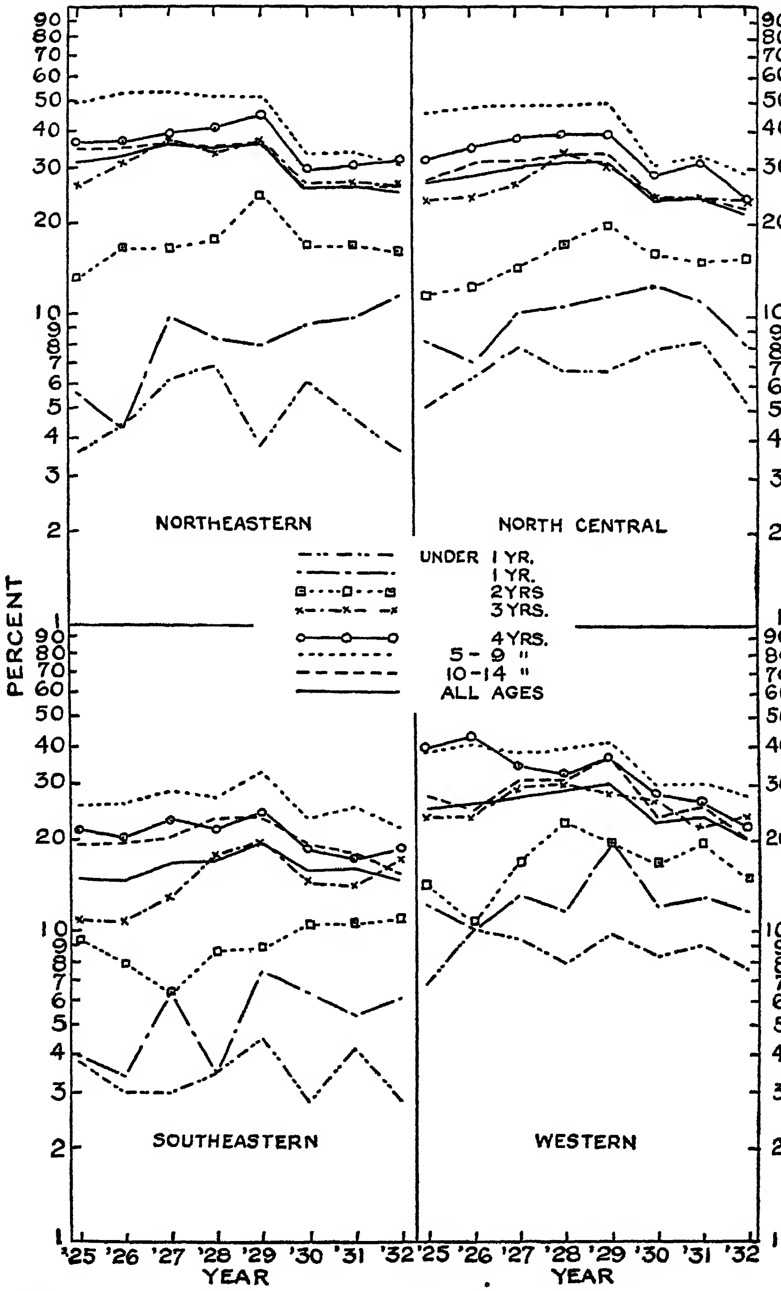

FIGURE 1.—Number of deaths from automobile accidents per 100 deaths from all accidents, by age, in different geographic regions, 1925–32, white and colored combined (logarithmic scale).

RELATIVE MORTALITY BY REGION, SPECIFIC FOR AGE

With the use of data from table 1, figure 2 shows the time changes in the relative mortality from automobile accidents at specific ages for the different regions. While the regions are not similarly ordered at each age, attention must be directed to certain other important observable facts relating to order. With the possible exception of age under 1 year, the Southeastern region shows the lowest relative mortality at each age and for each age group. Furthermore, at ages under 1 and 1, there is a tendency for the regions to be ordered with respect to decreasing magnitude of relative mortality, as follows: Western, North Central, Northeastern, and Southeastern. Ages 2, 3, and 4, and the age group 10 to 14 years disclose a definite separation of the regions into 2 groups, the first comprising the Northeastern, North Central, and Western regions, and the second comprising only 1 member, namely, the Southeastern, with relative mortality rates of a lower order of magnitude. The age groups 5 to 9 years and all ages behave similarly with the Northeastern region highest, and followed by the North Central, Western, and Southeastern in decreasing order.

Figure 2 shows, moreover, that the time trends of relative mortality, while generally on different levels, vary with age and region. For ages under 1 year each trend might be represented by a straight line parallel to the time axis, indicating that the relative mortality for infants under 1 year of age has been generally on the same level, neither increasing nor decreasing, for each region during the years 1925–32. For the remaining ages and age groups the pictures are definitely different. At 1 year of age the trend for the Northeastern region increases rapidly; for the other regions the neighborhood of 1929 begins to make itself felt in that the relative mortality increases to that neighborhood and then perceptibly declines. At 2 years of age the trend for the Southeastern region is on the increase while the Northeastern and North Central regions show an increase to 1929 followed by a decrease; the Western region has its peak 1 year earlier. At 3 years of age the trends increase to 1928 or 1929 and decrease thereafter. Finally, at 4 years and for the age groups 5 to 9, 10 to 14, and all ages, with the possible exception of the relative mortality at 4 years of age for the Western region, which shows a decrease over the entire period, the trends rise to 1929 and fall subsequently. It is tempting to believe that the introduction or better enforcement of accident prevention laws or possibly the economic depression caused the decline in the trends after 1929. It will be seen later, however, that when a different measure of mortality is employed for children under 15 years of age the uniqueness of the year 1929 vanishes.

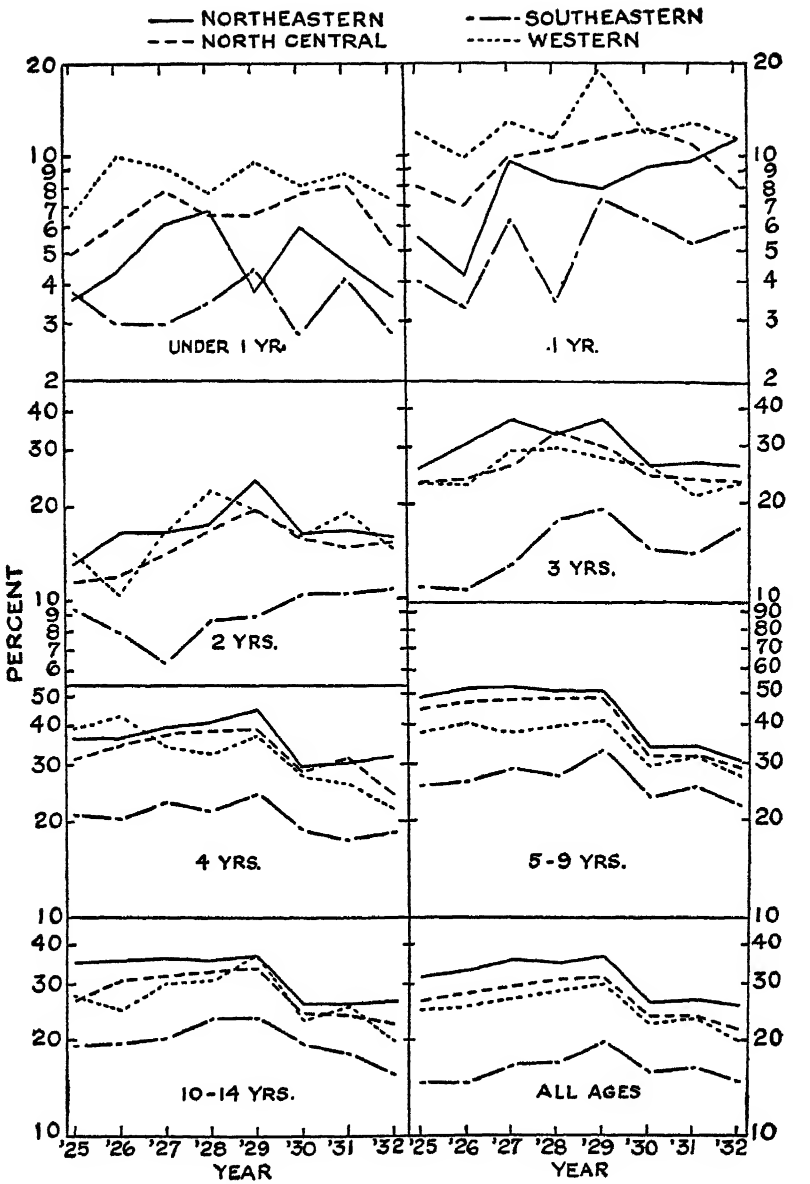

FIGURE 2.—Number of deaths from automobile accidents per 100 deaths from all accidents, by geographic region, at different ages, 1925-32, white and colored combined (logarithmic scale).

MORTALITY RELATED TO THE NUMBER OF REGISTERED AUTOMOBILES AND TO THE GASOLINE CONSUMED

In the preceding section reference was made to the order of the regions as shown in figure 2 for all ages (under 15 years). The Northeastern region led and was followed by the North Central, Western, and Southeastern, respectively. When another measure of mortality is chosen, namely, the number of deaths under 15 years of age per 100,000 registered automobiles,[2] this order of the regions is disturbed. The changed order is shown graphically in figure 3 (*c*). It will be observed that the Northeastern region leads to 1931. In 1932 the Southeastern region assumes first place, while the Northeastern, North Central, and Western, respectively, follow. It is important to emphasize that, with the possible exception of the trend for the Southeastern region, which is practically level, the trends for the other regions have declined steadily during 1925–32. This means that the mortality from automobile accidents per 100,000 registered automobiles among children under 15 years of age declined regularly in the Northeastern, North Central, and Western regions during the 8 years under observation.

In the absence of mileage data, the number of deaths from automobile accidents among children under 15 years of age has been related to the number of gallons of gasoline consumed, and this is shown graphically in figure 3 (*a*). It is seen that the order of the regions is little disturbed by the substitution of gasoline consumed for the number of registered automobiles. The trends of mortality in the first instance, however, are declining more rapidly, and this holds for each region.

Figure 3 (*b*) shows the increase in the number of gallons of gasoline consumed per automobile in each region during the 8 years 1925–32, and is of considerable interest when compared with the decreasing mortality per 50 million gallons of consumed gasoline shown in figure 3 (*a*).

SUMMARY

This, the second paper of a series on the fatal accidents of childhood, deals with time changes in the relative mortality from automobile accidents among children under 15 years of age in different geographic regions of the United States during 1925–32. Relative mortality is defined as the ratio of the number of fatalities from automobile accidents to the number of fatalities from all accidents. In addition, mortality is related to the number of registered automobiles and to the number of gallons of gasoline consumed.

[2] Includes passenger automobiles, taxis, busses, motor trucks, and road tractors.

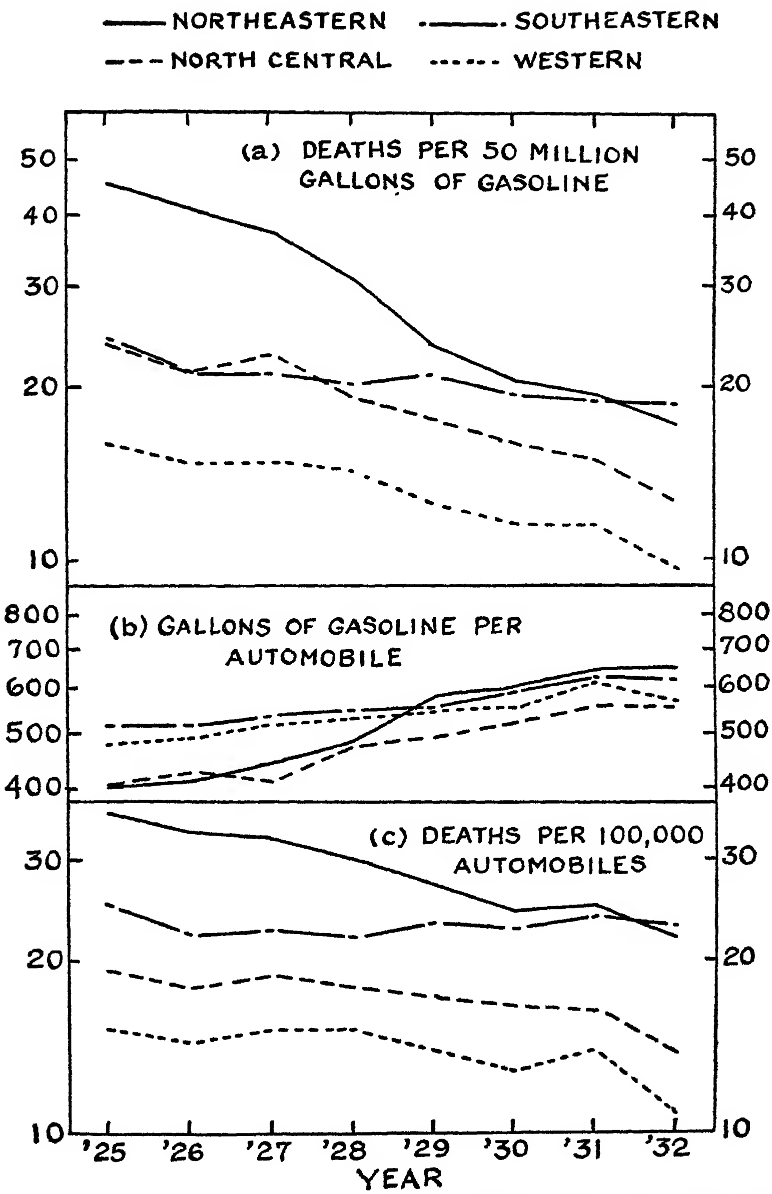

FIGURE 3.—(a) Number of deaths from automobile accidents among children under 15 years of age per 50,000,000 gallons of consumed gasoline, by geographic region, 1925–32, white and colored combined; (b) number of gallons of gasoline consumed per automobile, by geographic region, 1925–32; and (c) number of deaths from automobile accidents among children under 15 years of age per 100,000 registered automobiles, by geographic region, 1925–32, white and colored combined (logarithmic scales).

The death registration States of 1925, consisting of 40 States and the District of Columbia, are divided into 4 geographic regions: A Northwestern, a North Central, a Southeastern, and a Western.

Relative mortality by age, specific for region.—While the ranges of relative mortality for the various ages and age groups considered as a unit differ in the different regions for the period 1925–32, the order of the ages within each unit is similar in the different regions, the age group 5 to 9 years generally leading and the age under 1 year consistently the lowest.

Relative mortality by region, specific for age.—The regions are not similarly ordered at each age with respect to the relative mortality during 1925–32. With the possible exception of age under 1 year, the Southeastern region shows the lowest relative mortality at each age and for each age group. The Western region leads at ages under 1 and 1 year, while for 5 to 9 years and all ages the Northeastern leads. At each of the remaining ages and for the age group 10 to 14 years it is doubtful which region (Northeastern, North Central, or Western) has the highest relative mortality.

The time trends of relative mortality, while generally on different levels, vary with age and region. When all ages under 15 years are combined, for example, the trend for each region rises to 1929 and falls thereafter.

Mortality of children under 15 years of age related to the number of registered automobiles and to the number of gallons of gasoline consumed, 1925–32.—With regard to the trend of the deaths per 100,000 registered automobiles, the Southeastern region shows a level one; the trend for each of the remaining regions, on the other hand, shows a decline.

The trend of the consumption of gasoline per automobile steadily increased in each region during the 8 years. During the same period of time, however, the number of deaths under 15 years of age per 50 million gallons of consumed gasoline declined in each region.

REFERENCE

(1) Gafafer, W. M.: (1936) Mortality from automobile accidents among childern in different geographic regions of the United States, 1930. Studies on the fatal accidents of childhood no. 1. Pub. Health Rep., 51: 1083–1090 (1936).

A FURTHER STUDY OF THE FERGUSON FORM BOARD TEST

By M. J. Pescor, *Assistant Surgeon, United States Public Health Service, United States Northeastern Penitentiary, Lewisburg, Pa.*

This paper is a sequel to an article published in the Public Health Reports for December 27, 1935 (*1*). The present study deals with the relationship of the Ferguson Form Board, the Stanford Achievement and the Army Beta Tests. A descriptive account of the first may be found in Ferguson's original article (*2*), Bronner et al. (*3*), or in Public Health Bulletin No. 206 (*4*); a description of the second, in a manual of instructions issued by the copyright owners (*5*); and of the third, in the manual of Army mental tests (*6*).

There are two methods of scoring the Ferguson Test. In the original method each board is scored alike, using a 5, 4, 3, 2, 1 ratio, based on the time required to complete each board; the maximum total raw score being 30. In the Shimberg modification, scoring is weighted for each board and the total raw scores are converted to corresponding mental ages. As fully explained in his preceding article, the author has made certain minor changes empirically expanding the Shimberg scale, so that it includes all mental ages from 6 through 17 years (*1*).

The Stanford Achievement norms may be expressed either in terms of educational grade status or educational age. Thus, an educational grade status of 4.1 indicates the equivalent of 1 month of a fourth-grade education. The corresponding educational age of 9 years 11 months indicates the average age of pupils who attend such a grade. The scoring of the Army Beta Test is familiar to all, well standardized, and therefore needs no further explanation.

The data for this investigation were obtained from the files of the United States Northeastern Penitentiary Hospital, with the exception of the Stanford Achievement data, which were furnished through the courtesy of the institutional director of education. The selected group of 500 individuals included only those who were unable to take the Stanford-Binet or Army Alpha Tests because of language difficulties, illiteracy, or other valid reason, necessitating the use of a nonlanguage test such as the Army Beta. They were chosen from the 3,313 inmates admitted to the United States Northeastern Penitentiary from December 27, 1932, to November 16, 1935. Practically all of them came from the Northeastern section of the United States, including all of New England, New York, New Jersey, Delaware, Maryland, Pennsylvania, and parts of Ohio and West Virginia.

A general statistical analysis of the selected group reveals that the age range is from 20 to 73 years, with an average age of 38.26 years. Latins comprise 43.6 percent of the group, Nordics 18.2 percent, Slavs 12.2 percent, Colored 8.6 percent, Semitics 8.2 percent, Greeks

4.2 percent, and the remaining 5 percent includes miscellaneous races too few in number to consider separately. Only 8.2 percent gave a history of attending college or high school, 26.4 percent attended secondary grades, 45.2 percent primary grades, and 20 2 percent had no education at all. Unskilled laborers head the list with 53 6 percent, skilled laborers come second with 32.4 percent, and clerical and professional are last with 14 percent. Married individuals constitute 57.6 percent of the group, single 33 8 percent, divorced, separated, and widowed combined 8.6 percent. Almost half (42.4 percent) of the individuals were convicted for the passing and possession of counterfeit money, 22.8 percent were sentenced for the illegal manufacture of liquor, 12.2 percent for violation of the narcotic law, 5.8 percent for violation of the immigration law, and the remaining 16.8 percent for sundry offenses, including violation of the Bankruptcy Act, Dyer Act, Interstate Commerce Act, and other Federal laws. Those convicted for the first time form 69.8 percent of the group, and recidivists account for 30.2 percent.

Distribution curves were first plotted for all 3 tests. Figure 1 presents the following:

(1) Mental ages obtained by the use of the Army Beta Test.
(2) Mental ages obtained by the use of the Ferguson Test, employing the Shimberg method of scoring.
(3) Educational ages determined by the use of the Stanford Achievement Test.

Figure 2 presents the distribution of raw scores according to the original method of scoring the Ferguson Test.

It is quite apparent that the original method of scoring the Ferguson Test gives a much better type of distribution than does the Shimberg modification. According to the latter, the highest frequency is at the highest attainable score, a mental age of 17 years, and according to the former no one makes a perfect score, the closest approximation being 25, or 5 less than the maximum. The Army Beta curve is fairly well balanced, with a peak at a mental age of 11, which coincides with the median mental age. The abnormal distribution of educational ages is to be expected, owing to the type of individuals selected for this study, 209 out of the 500 being considered illiterate in the English language, according to the norms of the Stanford Achievement Test.

The coefficient of correlation between the Army Beta and Ferguson Tests on the basis of the entire group of 500 cases was found to be $.50 \pm .003$. Since the illiterates had to be excluded, correlation between the above tests and the Stanford Achievement were computed

on the basis of the 291 individuals who were able to score on the latter. These correlations were found to be as follows.

(1) Ferguson *vs* Stanford Achievement.. 0.15±0.004
(2) Ferguson *vs*. Army Beta............. .49± .004
(3) Army Beta *vs* Stanford Achievement. .46± .004

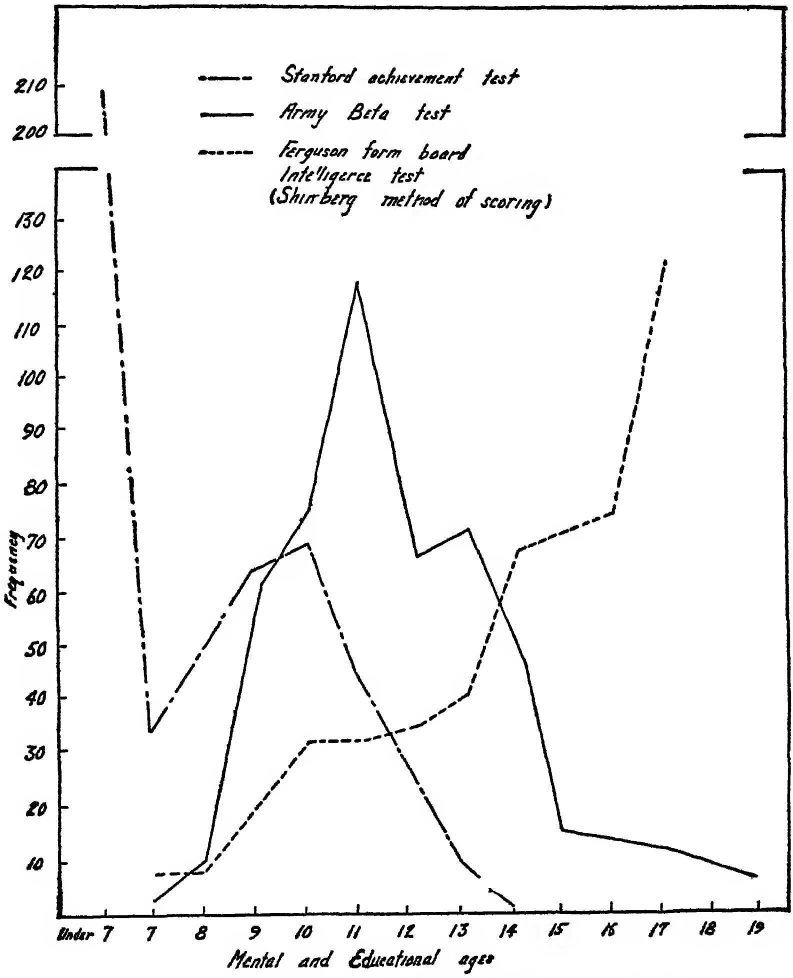

FIGURE 1.—Distribution of mental and educational ages of 500 inmates of the United States Northeastern Penitentiary, Lewisburg, Pa

The findings seem to indicate that the Ferguson and Stanford Achievement tests do not measure a common factor and that the Army Beta stands about halfway between the two, having one factor in common with the Ferguson and another in common with the Stanford Achievement Test.

As previously noted, the main group was divided into two subgroups on the basis of the Stanford Achievement data. The first consists of the 209 inmates who were found illiterate as far as the English language is concerned. As a matter of fact, only 74 were found to be totally illiterate; that is, could not read or write in any language. The second consists of the 291 individuals who were considered literate by the test results. Comparative mental age averages were then determined for the main group and two subgroups on the basis of a further subdivision according to race, age, marital status, occupation, education,

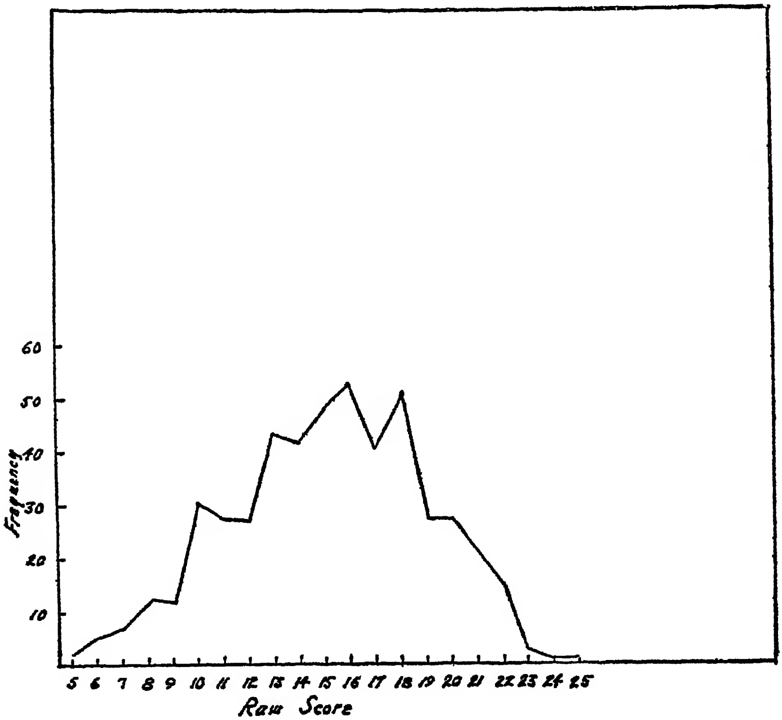

FIGURE 2.—Distribution of the raw scores made by 500 inmates of the United States Northeastern Penitentiary, Lewisburg, Pa., on the Ferguson Form Board Test, using Ferguson's original method of scoring

nature of offense, and number of convictions. Since a complete tabulation of the results would be too cumbersome and of doubtful value, only the general findings and impressions are presented.

First of all, considering the main group of 500, the composite individual most likely to get a low score on the Ferguson Test would be colored, 41 years or more of age, divorced, an unskilled laborer, uneducated, convicted for violation of the narcotic law, and a recidivist. The one most likely to get a high score would be a Nordic, 29 to 32 years of age, married, a skilled laborer, educated in a foreign institution for higher learning, convicted for the illegal manufacture of

liquor, and a first offender. The one most likely to get a low score on the Beta Test would be colored, 41 years or more of age, separated from his wife, an unskilled laborer, uneducated, convicted for the illegal manufacture of liquor, and a first offender. The one most likely to get a high score would be a Nordic, 25 to 28 years of age, single, a clerical or professional worker, educated in a foreign institution of higher learning, convicted for the violation of the immigration law, and a recidivist.

The composite pictures for the illiterate group are essentially the same as for the combined, with the following exceptions:

(1) For the low Ferguson score the age group is 33 to 36 instead of 41 or more.

(2) For the high Ferguson score the age group is 25 to 28 instead of 29 to 32.

(3) For the high Beta score, married instead of single and first offender instead of recidivist.

The findings for the literate group agree with those of the combined group with only one exception, namely, on the high Beta score the age group 17–24 should be substituted for the 25–28.

In making a general statistical comparison between the original group of 1,000 inmates and the present group of 500, the former averages 5 years younger, is predominantly Nordic in contrast to southern European, is better educated, includes no illiterates, and embraces a much higher percentage of clerical or professional workers. In other respects there is very little difference.

Both the previous study and the present study indicate that the Shimberg modification of scoring the Ferguson Test is unsatisfactory, since it does not discriminate sufficiently at the upper mental age levels. For this reason, the original method of scoring is superior. Using the Stanford Achievement Test as a standard, correlations show that the Stanford-Binet Intelligence Test is most closely allied to the former, the Army Beta is next in order, and the Ferguson Test comes last. In other words, the Stanford-Binet is primarily a language test, the Army Beta stands about half way between a language and nonlanguage test, and the Ferguson is predominantly a nonlanguage test.

Comparative mental-age averages show that, in all instances, skilled workers score highest on the Ferguson Test, whereas clerical workers score highest on the Stanford-Binet and Army Beta Tests. Semitics score highest on the Stanford-Binet, but in all other tests Nordics have the edge. Negroes uniformly make the poorest showing. In general, the more rudimentary the education, the lower the score on all tests. Age does not show any strong central tendency. Recidi-

vists consistently score lower on the Ferguson than do first offenders. This also holds true for the Stanford-Binet. On the Army Beta, however, recidivists score higher than first offenders.

The question naturally arises as to which one of these tests is preferable from the standpoint of measuring native intelligence. While the Ferguson appears to have the advantage, since it is not so dependent on education, it is doubtful whether any single test can be used as the sole criterion. Many individuals who make a high score on the Ferguson fail deplorably on the Stanford-Binet, and vice versa. For this reason it seems more logical to adopt Thorndike's classification as presented by Pintner (7), namely, that there are three kinds of intelligence—concrete, abstract, and social. The ideal situation would be to have a battery of three tests corresponding to the three types of intelligence and to record each mental age separately.

Of the tests under investigation, the Ferguson apparently measures concrete intelligence, since it is nonverbal and uniformly easier for skilled workers who naturally deal with concrete objects. The Stanford-Binet, on the other hand, measures abstract intelligence, since it is obviously a verbal test and is easier for clerical and professional workers who deal with more or less abstract matters. While the Army Beta is classed as a nonverbal test, it does require some abstract knowledge to pass it—for example, the ability to write and recognize numbers. The most satisfactory combination of the above tests would be the Stanford-Binet and Ferguson for the examination of the literates and the Army Beta and Ferguson for the examination of illiterates and foreign-born individuals with a language handicap.

CONCLUSIONS

1. The original method of scoring the Ferguson Form Board Test appears to be preferable to the Slimberg modification.

2. The coefficient of correlation between the Ferguson and Army Beta Tests is 0.50, between the Ferguson and the Stanford Achievement 0.15, and between the Army Beta and Stanford Achievement 0.46.

3. The composite individual most likely to get a low score on the Ferguson Test would be colored, 41 years or more of age, divorced, an unskilled laborer, uneducated, convicted for violation of the narcotic law, and a recidivist.

4. The composite individual most likely to get a high score on the Ferguson Test would be a Nordic, 29 to 32 years of age, married, a skilled laborer, educated in a foreign institution of higher learning, convicted for the illegal manufacture of liquor, and a first offender.

5. The composite individual most likely to get a low score on the Army Beta Test would be colored, 41 years or more of age, separated

from his wife, an unskilled laborer, uneducated, convicted for the illegal manufacture of liquor, and a first offender.

6. The composite individual most likely to get a high score on the Army Beta Test would be a Nordic, 25 to 28 years of age, single, a clerical or professional worker, educated in a foreign institution of higher learning, convicted for the violation of the immigration law, and a recidivist.

7. The Ferguson apparently measures concrete intelligence while the Stanford-Binet and, to a lesser extent, the Army Beta measure abstract intelligence.

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AN IMPROVED TECHNIQUE FOR THE SPECTROGRAPHIC ANALYSIS OF BLOOD SAMPLES BY THE GRAPHITE ARC METHOD [1]

By F. H. Goldman, *Associate Chemist*, and D. W. Armstrong, *Junior Physicist*, *U. S. Public Health Service*

Minute amounts of the heavy metals, such as lead, silver, and mercury, in body fluids and tissues can be estimated by the general spectrographic method of Nitchie and Standen (*1*) (*2*), using the graphite arc. Following this method, the sample is burned in the direct current arc, using 5/16 inch graphite rods as electrodes. The rod that is used as the anode holds the sample in a cavity which is drilled with a 1/8-inch drill to a depth of about 3/8 inch. After the cavity is drilled, the rod is burned for 1 minute at 10 amperes to make the graphite porous. After cooling, it is "loaded" with 0.1 cc of sample.

The usual procedure in testing blood consists either in ashing the blood and burning the ash in the arc (*3*), or in burning the whole blood in the arc. The ashing process is impossible where elements which

[1] From the Industrial Hygiene Laboratory of the Office of Industrial Hygiene and Sanitation, U. S. Public Health Service.

are volatile at low temperatures are dealt with, and may be inaccurate because of possible uneven dispersion of the element throughout the ash. Whole blood introduced into the prepared graphite rod does not absorb into the rod nor penetrate it to any extent. The blood forms a "skin" on the end of the rod and clots there. Laked or diluted blood is but slightly better in this respect. There are two methods of procedure for burning the sample.

One method is to bring the graphites into contact immediately after filling, and allow the blood to char for some 15 seconds without actually burning (*4*), after which the graphites are separated and the arc is struck. During the charring process volatile matter is driven off. At times spattering also occurs, or the blood may run down the side of the rod. In the case of a volatile element, such as mercury, this procedure would lead to inaccuracy, and the mechanical losses would also cause inaccuracies with any other element.

Another procedure is to dry the blood on the graphite. When this is done, a great part of the coagulated material remains on the surface of the graphite rod. In this case it is often difficult even to strike the arc. At other times the blood burns off with almost explosive violence, possibly without being recorded on the photographic plate.

In order to obviate these difficulties, a more satisfactory technique had to be developed. It was thought that some substance might be added to the blood which would increase its wetting power and absorption into the graphite rod. Several substances were tried, including sodium taurocholate and saponin. Saponin proved most promising. Saponin, when added to blood in small amounts, will cause it to lake. However, as the concentration of saponin is increased, the wetting power and the absorption of the blood on graphite increase. After a series of experiments to find optimum conditions for its use, the procedure described in the following paragraphs was adopted.

A solution of saponin is made up by adding 40 grams of saponin to 100 cc of water. Three cc of the saponin solution are added to 7 cc of blood. It is shaken and allowed to stand 5 minutes. Greater amounts of saponin solution may be used, but this means greater dilution of the sample. For different amounts of blood, the same proportion of blood to saponin should be used. With the concentration of saponin recommended, the sample absorbs into the rod very readily. Only a slight stain appears on the surface after drying.

When the sample will not stand dilution, it is treated as follows: One gram of saponin is added to 10 cc of blood and shaken to dissolve the saponin. This will give a satisfactory solution, but the above-described method is better.

For quantitative spectrographic analysis an internal standard is necessary. Thallium has been used with success in our laboratories for the determination of mercury. Thallium sulphate may be added to the saponin solution or it may be added directly to the blood sample without coagulation. In addition, the surface of the anode, after burning, is smoothed with a clean steel blade. The sample is introduced into the cup of the graphite by means of a 1-cc tuberculin syringe. A syringe is preferable to a pipette because the needle can be introduced to the bottom of the hole in the graphite, thus minimizing the danger of entrapping air bubbles.

Samples prepared according to this technique burn evenly, give a satisfactory arc, and photograph well. The spectral lines are clear and well defined and lend themselves excellently to quantitative investigation.

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DEATHS DURING WEEK ENDED AUG. 8, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug 8, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	6,972	6,821
Deaths per 1,000 population, annual basis	9.7	9.5
Deaths under 1 year of age	451	487
Deaths under 1 year of age per 1,000 estimated live births	41	44
Deaths per 1,000 population, annual basis, first 32 weeks of year	12.7	11.8
Data from industrial insurance companies:		
Policies in force	68,159,773	67,847,909
Number of death claims	12,210	11,021
Death claims per 1,000 policies in force, annual rate	9.4	8.5
Death claims per 1,000 policies, first 32 weeks of year, annual rate	10.4	10.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Aug. 15, 1936, and Aug. 17, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 15, 1936, and Aug. 17, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug 17, 1935	Week ended Aug. 15, 1936	Week ended Aug 17, 1935
New England States:								
Maine	1	1	1		7	6	0	0
New Hampshire					3	2	0	0
Vermont		2			1	9	0	0
Massachusetts	6	2			52	22	4	0
Rhode Island		2				11	0	0
Connecticut	1	4			10	15	0	1
Middle Atlantic States:								
New York	18	14	[1] 1	[1] 2	120	192	8	14
New Jersey	8	9	10	8	52	30	2	2
Pennsylvania	17	27			53	77	3	4
East North Central States:								
Ohio	17	20	9	15	32	63	8	3
Indiana	15	7	5	19		5	0	2
Illinois	21	17	3	9	7	52	1	7
Michigan	7	5		4	13	48	2	3
Wisconsin	1		11	20	16	148	0	2
West North Central States:								
Minnesota	2	2			5	11	0	0
Iowa	3	4		1		4	0	3
Missouri	8	17	22	64	1	10	1	1
North Dakota				5		8	0	0
South Dakota	1	7			3		0	0
Nebraska	2	2			5	2	1	0
Kansas	7	6		1	1	12	2	1
South Atlantic States:								
Delaware		1			1	1	0	0
Maryland [2 3 4]	6	3	2		18	5	3	5
District of Columbia [3]	4	9			4	7	3	8
Virginia [3 4]	10	19			43	16	1	4
West Virginia	11	13	2	21	32	4	0	3
North Carolina [3 4]	16	19	2	1	1	8	0	0
South Carolina	2	12	52	49	5	4	0	0
Georgia [4]	13	15					2	0
Florida [4]	1	5		1	2	2	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 15, 1936, and Aug. 17, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 15, 1936	Week ended Aug 17, 1935	Week ended Aug 15, 1936	Week ended Aug 17, 1935	Week ended Aug 15, 1936	Week ended Aug 17, 1935	Week ended Aug. 15, 1936	Week ended Aug 17, 1935
East South Central States:								
Kentucky	6	12		43	8	59	2	2
Tennessee	16	14	11	4	4		2	6
Alabama [4]	9	19	5	8	2	7	0	0
Mississippi [2]	6	15					1	0
West South Central States:								
Arkansas	5	16	6	2		1	0	0
Louisiana	14	13	20	13	5	7	2	1
Oklahoma [5]	4	6		19	1	5	0	1
Texas [4]	28	39	40	22	12	5	1	0
Mountain States:								
Montana	1	1	2			9	2	0
Idaho					3	2	0	0
Wyoming					1	1	0	0
Colorado	1	5			3	7	1	2
New Mexico	1	2			8	1	0	0
Arizona		1	16	2	6		1	0
Utah [2]		1			9	2	0	0
Pacific States:								
Washington	1	1			6	19	0	0
Oregon [3]		2	6	8	3	41	0	0
California	26	10	11	3	55	100	3	3
Total	316	401	237	344	613	1,046	56	78
First 33 weeks of year	15,112	18,120	141,737	104,111	270,050	695,479	5,958	4,165

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 15, 1936	Week ended Aug 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935
New England States:								
Maine	6	4	2	6	0	0	4	4
New Hampshire	0	9	2	2	0	0	0	0
Vermont	0	0	1	8	0	0	0	0
Massachusetts	1	116	41	40	0	0	2	6
Rhode Island	0	12		5	0	0	1	1
Connecticut	1	43	8	8	0	0	2	5
Middle Atlantic States:								
New York	7	244	101	82	0	0	28	28
New Jersey	0	19	30	16	0	0	11	9
Pennsylvania	5	12	75	109	0	0	18	18
East North Central States:								
Ohio	11	9	98	52	4	0	16	19
Indiana	1	3	14	17	0	0	8	9
Illinois	9	13	99	112	2	2	21	49
Michigan	4	40	73	41	1	0	14	11
Wisconsin	0	1	56	53	1	2	2	4
West North Central States:								
Minnesota	0	4	22	25	2	0	1	15
Iowa	2	8	19	7	1	0	1	15
Missouri	0	2	23	17	2	1	22	17
North Dakota	0	1	2	12	1	0	0	1
South Dakota	1	0	11	25	0	1	4	2
Nebraska	0	0	8	9	0	1	2	0
Kansas	2	0	71	18	0	0	13	30
South Atlantic States:								
Delaware	0	0	1	1	0	0	0	1
Maryland [2 3 4]	0	5	9	9	0	0	3	17
District of Columbia [3]	0	4	2	3	0	0	1	3
Virginia [3 4]	6	73	6	19	0	0	25	32
West Virginia	2	3	6	26	0	1	12	21
North Carolina [3 4]	7	17	19	17	0	0	30	21
South Carolina	0	0		1	0	0	10	29
Georgia [4]	2	1	11	5	0	6	37	55
Florida [4]	3	1	5	3	0	0	1	14

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 15, 1936, and Aug. 17, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935	Week ended Aug. 15, 1936	Week ended Aug. 17, 1935
East South Central States:								
Kentucky	6	27	10	-------	0	0	41	61
Tennessee	20	3	12	10	0	0	54	56
Alabama [4]	22	2	5	6	0	1	28	6
Mississippi [2]	11	0	1	5	0	0	13	5
West South Central States:								
Arkansas	0	1	3	9	0	2	14	13
Louisiana	0	4	3	9	0	0	27	21
Oklahoma [5]	0	0	3	8	0	0	18	27
Texas [4]	2	1	17	28	1	0	30	54
Mountain States:								
Montana	0	0	7	-------	[4] 23	1	8	4
Idaho	2	0	3	1	[4] 1	0	2	2
Wyoming	0	0	4	4	0	1	3	1
Colorado	2	0	6	15	0	1	1	7
New Mexico	0	0	4	6	0	0	10	13
Arizona	0	1	-------	3	0	0	0	5
Utah [2]	0	2	4	18	0	0	0	0
Pacific States:								
Washington	3	1	11	18	0	1	2	3
Oregon [3]	1	1	2	11	0	0	2	6
California	8	34	69	49	2	0	21	10
Total	147	721	979	948	41	21	563	730
First 33 weeks of year	1,367	3,522	183,952	180,379	6,245	5,311	6,896	9,248

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Aug. 18, 1936, 10 cases, as follows: Maryland, 3; District of Columbia, 1; Virginia, 2; North Carolina, 3; Oregon, 1.
[4] Typhus fever, week ended Aug. 15, 1936, 71 cases, as follows: Maryland, 1; Virginia, 1; North Carolina 1; Georgia, 41; Florida, 3; Alabama, 13, Texas. 11.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1936										
Florida	8	-------	21	14	39	4	4	13	0	9
Massachusetts	15	20	-------	1	4,066	-------	6	724	0	12
July 1936										
California	34	121	825	15	2,294	13	52	556	8	49
Delaware	-------	7	-------	-------	15	-------	0	4	0	1
Michigan	8	52	3	9	119	-------	10	437	1	30
New Jersey	12	32	17	6	709	-------	2	192	0	22
Ohio	21	69	30	5	478	1	7	281	6	63
Wyoming	-------	1	1	-------	13	-------	0	43	16	1

June 1936

	Cases
Florida:	
Chicken pox	21
Dysentery	6
Mumps	58
Typhus fever	2
Undulant fever	1
Whooping cough	36
Massachusetts:	
Actinomycosis	1
Anthrax	1
Chicken pox	893
Dysentery (bacillary)	8
Epidemic encephalitis	2
German measles	684
Lead poisoning	3
Mumps	1,232
Ophthalmia neonatorum	99
Rabies in animals	12
Septic sore throat	16
Tetanus	5
Trachoma	5
Trichinosis	1
Undulant fever	1
Whooping cough	390

July 1936

	Cases
Anthrax:	
New Jersey	1
Botulism:	
California	4
Chicken pox:	
California	622
Delaware	7
Michigan	575
New Jersey	283
Ohio	277
Wyoming	14
Diarrhea and enteritis:	
Ohio (under 2 years)	12
Dysentery:	
California (amoebic)	10
Dysentery—Continued.	
California (bacillary)	30
New Jersey (amoebic)	1
Epidemic encephalitis:	
California	6
Michigan	1
Ohio	2
Food poisoning:	
California	185
German measles:	
California	174
Delaware	2
Michigan	152
New Jersey	138
Ohio	21
Granuloma, coccidioidal:	
California	3
Lead poisoning:	
Ohio	4
Leprosy:	
California	1
Mumps:	
California	1,062
Delaware	4
Michigan	215
New Jersey	481
Ohio	120
Wyoming	28
Ophthalmia neonatorum:	
California	3
New Jersey	8
Ohio	60
Paratyphoid fever:	
California	6
Michigan	3
New Jersey	2
Plague:	
California	1
Rabies in animals:	
California	83
Michigan	8
New Jersey	8
Rabies in man:	
California	1
Relapsing fever:	
California	5
Rocky Mountain spotted fever:	
New Jersey	3
Wyoming	4
Septic sore throat:	
California	33
Michigan	19
Ohio	83
Wyoming	2
Tetanus:	
California	7
Michigan	1
New Jersey	2
Ohio	1
Trachoma:	
California	9
New Jersey	5
Ohio	3
Trichinosis:	
California	2
New Jersey	1
Tularaemia:	
California	7
Wyoming	1
Undulant fever:	
California	16
Michigan	6
New Jersey	3
Ohio	9
Vincent's infection:	
Michigan	30
Whooping cough:	
California	1,470
Delaware	43
Michigan	1,153
New Jersey	614
Ohio	1,261
Wyoming	8

RODENT PLAGUE IN BEAVER COUNTY, UTAH

A ground squirrel, *Citellus grammurus*, found in Indian Creek Canyon, 11 miles northeast of Beaver, Beaver County, Utah, was reported under date of August 7, 1936, to have been found plague-infected.

CASES OF VENEREAL DISEASES REPORTED FOR JUNE 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama [1]				
Arizona	28	0.61	62	1.36
Arkansas	155	.83	80	.43
California	1,116	1.81	989	1.61
Colorado [2]				
Connecticut	224	1.35	146	.88
Delaware	120	4.96	45	1.86
District of Columbia	169	3.40	136	2.74
Florida [1]				
Georgia	1,069	3.67	467	1.60
Idaho	0		0	
Illinois	1,312	1.67	1,022	1.30
Indiana	112	.34	112	.34
Iowa	73	.29	141	.57
Kansas	50	.31	88	.46
Kentucky	155	.58	222	.84
Louisiana	138	.64	78	.36
Maine	30	.37	35	.44
Maryl. n l.	1,018	6.09	258	1.54
Massachusetts	423	.98	406	.94
Michigan	542	1.06	549	1.08
Minnesota	249	.96	293	1.13
Mississippi	1,426	6.93	1,984	9.65
Missouri	215	.58	117	.32
Montana	47	.87	38	.71
Nebraska	19	.14	75	.54
Nevada [1]				
New Hampshire	8	.17	12	.26
New Jersey	682	1.61	269	.64
New Mexico	62	1.42	37	.85
New York	8,167	6.25	1,925	1.47
North Carolina	1,344	4.07	389	1.18
North Dakota	13	.19	47	.68
Ohio	613	.90	290	.42
Oklahoma	163	.66	145	.59
Oregon	97	.98	126	1.27
Pennsylvania [3]	314	.32	191	.19
Rhode Island	106	1.50	39	.55
South Carolina	223	1.27	323	1.85
South Dakota	2	.03	19	.27
Tennessee	835	3.12	455	1.70
Texas	446	.73	210	.35
Utah [2]				
Vermont	26	.72	26	.72
Virginia	421	1.72	259	1.06
Washington	153	.95	222	1.38
West Virginia	179	1.00	120	.67
Wisconsin [4]	22	.07	137	.46
Wyoming [2]				
Total	22,575	1.88	12,584	1.05

See footnotes at end of table.

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio	18	0.66	8	0.29
Atlanta, Ga	166	5.78	187	6.51
Baltimore, Md	600	7.27	160	1.94
Birmingham, Ala	135	4.78	66	2.34
Boston, Mass	176	2.23	131	1.66
Buffalo, N. Y.[1]				
Chicago, Ill	827	2.32	745	2.09
Cincinnati, Ohio	54	1.16	42	.90
Cleveland, Ohio	293	3.15	110	1.18
Columbus, Ohio	23	.75	15	.49
Dallas, Tex	109	3.76	33	1.14
Dayton, Ohio[1]				
Denver, Colo	33	1.11	24	.81
Detroit, Mich.[1]				
Houston, Tex.[5]	192	5.73	67	2.00
Indianapolis, Ind	24	.64	35	.93
Jersey City, N. J	1	.03	1	.03
Kansas City, Mo	42	1.00	3	.07
Los Angeles, Calif	371	2.59	285	1.99
Louisville, Ky	243	7.50	136	4.20
Memphis, Tenn	154	5.77	64	2.40
Milwaukee, Wis	5	.08	27	.44
Minneapolis, Minn	58	1.19	104	2.14
Newark, N. J	283	6.11	106	2.29
New Orleans, La.[1]				
New York, N. Y	6,204	8.62	1,155	1.58
Oakland, Calif	30	1.29	36	1.19
Omaha, Nebr	7	.32	14	.64
Philadelphia, Pa	453	2.28	97	.49
Pittsburgh, Pa	61	.89	41	.60
Portland, Oreg.[1]				
Providence, R. I	50	1.93	18	.69
Rochester, N. Y.[1]				
St. Louis, Mo	80	.96	36	.43
St. Paul, Minn	30	1.06	40	1.42
San Antonio, Tex.[2]				
San Francisco, Calif	114	1.70	126	1.88
Seattle, Wash	93	2.45	122	3.21
Syracuse, N. Y	57	2.62	27	1.24
Toledo, Ohio	41	1.35	27	.89
Washington, D. C.[6]	169	3.40	136	2.74

[1] No report for current month.
[2] Not reporting.
[3] Includes only those cases that enter the clinics conducted by the State department of health.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by Jefferson Davis Hospital. Physicians are not required to report venereal diseases.
[6] Reported by Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 8, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Maine:											
Portland	0		0	2	0	0	0	0	0	1	23
New Hampshire:											
Concord	0		0	0	0	1	0	0	0	1	9
Manchester	0		0	0	0	0	0	0	0	0	11
Nashua	0			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	0	0	0	0	0	0	1	9
Rutland	0		0	0	0	0	0	0	0	1	6
Massachusetts:											
Boston	4		0	21	5	13	0	7	0	69	165
Fall River	0		0	1	1	2	0	3	0	0	31
Springfield	0		0	2	0	0	0	0	0	2	33
Worcester	0		0	4	4	1	0	1	0	14	33
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	19
Providence	0		0	0	1	3	0	2	1	7	45
Connecticut:											
Bridgeport	1		0	0	0	1	0	2	0	2	26
Hartford	0		0	1	0	3	0	0	0	1	24
New Haven	0		0	0	1	1	0	0	1	8	35
New York:											
Buffalo	1		0	6	11	4	0	0	0	5	103
New York	10	2	0	71	52	33	0	92	8	96	1,268
Rochester	0		0	1	1	3	0	0	2	2	53
Syracuse	0		0	4	0	1	0	0	0	12	36
New Jersey:											
Camden	0		0	0	1	2	0	1	0	3	28
Newark	0		0	9	2	1	0	6	0	27	78
Trenton	0		0	0	1	3	0	5	0	0	41
Pennsylvania:											
Philadelphia	2		1	8	13	13	0	18	6	71	398
Pittsburgh	1	1	1	0	8	13	0	8	1	66	144
Reading	0		0	1	2	0	0	0	2	8	27
Ohio:											
Cincinnati	2		0	1	9	4	0	4	0	1	106
Cleveland	2		0	5	9	26	0	13	1	64	158
Columbus	0	1	1	0	1	2	0	4	0	15	69
Toledo	0	1	1	0	4	1	0	3	0	32	53
Indiana:											
Anderson	0		0	0	1	0	0	0	0	1	7
Fort Wayne	1		0	0	1	2	0	0	0	0	23
Indianapolis	0		0	0	8	4	0	4	1	10	90
South Bend	2		0	0	0	0	0	0	0	10	18
Terre Haute	0		0	0	0	1	0	0	0	0	20
Illinois:											
Alton	0		0	0	0	0	0	0	0	0	8
Chicago	8	1	1	3	17	47	0	20	6	79	595
Elgin	0		0	0	0	0	0	0	0	2	10
Springfield	0		0	1	3	1	0	0	2	8	20
Michigan:											
Detroit	2		0	3	15	17	0	19	3	128	229
Flint	2		0	1	3	4	0	1	0	5	21
Grand Rapids	0		1	0	3	1	0	0	0	11	25
Wisconsin:											
Kenosha	0		0	0	0	0	0	0	0	0	
Madison	0		0	1	0	2	0	0	0	9	19
Milwaukee	0		0	3	3	22	0	2	0	38	92
Racine	0		0	0	0	3	0	0	0	0	20
Superior	0		0	0	0	1	0	0	0	5	9
Minnesota:											
Duluth	0		0	1	1	2	0	0	0	6	16
Minneapolis	0		0	2	1	6	0	2	0	5	80
St. Paul	0		0	1	2	1	0	0	0	13	49
Iowa:											
Cedar Rapids	0			0		0	0		0	1	
Davenport	0			0		1	0		0	0	
Des Moines	0			0		1	0		0	2	21
Sioux City	0			0		1	1		0	0	
Waterloo	0			0		0	0		0	5	

City reports for week ended Aug. 8, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Missouri:											
Kansas City	0	------	0	0	1	4	0	5	0	0	81
St. Joseph	------	------	------	------	1	------	------	2	------	------	13
St. Louis	0	------	0	0	4	4	0	7	2	7	138
North Dakota:											
Fargo	0	------	0	0	0	4	0	0	0	3	5
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	0	0	0	0	0	11
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	5	------	0	2	2	2	0	2	0	0	37
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	0
Topeka	0	------	1	0	0	2	0	0	0	2	21
Wichita	0	------	0	0	1	2	0	0	0	2	29
Delaware:											
Wilmington	0	------	0	1	1	1	0	0	1	1	18
Maryland:											
Baltimore	5	2	1	25	8	2	0	13	5	94	160
Cumberland	0	------	0	0	2	1	0	0	0	0	12
Frederick	0	------	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	1	------	0	7	4	4	0	8	2	30	119
Virginia:											
Lynchburg	0	------	0	0	1	1	0	0	2	0	20
Norfolk	0	------	0	0	1	2	0	1	0	0	31
Richmond	1	------	0	0	3	4	0	3	0	5	52
Roanoke	0	------	0	0	0	0	0	1	0	0	22
West Virginia:											
Charleston	0	------	0	1	0	0	0	1	0	0	8
Huntington	0	------	------	0	------	1	0	------	0	0	------
Wheeling	1	------	0	0	0	0	0	1	0	1	13
North Carolina:											
Gastonia	1	0	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	0	0	0	0	1	0	0	17
Wilmington	0	------	0	0	0	1	0	0	0	0	6
Winston-Salem	0	1	0	0	1	0	0	0	0	0	9
South Carolina:											
Charleston	------	2	0	0	0	0	0	0	0	3	14
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	0	0	0	0	0	0	4
Greenville	0	------	0	0	3	0	0	0	0	0	24
Georgia:											
Atlanta	1	1	1	0	5	3	0	8	2	4	103
Brunswick	0	------	0	0	0	0	0	0	0	0	3
Savannah	1	------	0	0	3	0	0	1	0	0	24
Florida:											
Miami	0	1	0	------	------	2	0	1	2	5	24
Tampa	0	------	0	0	0	1	0	1	0	4	20
Kentucky:											
Ashland	------	------	------	------	------	------	------	------	------	------	------
Covington	0	------	0	2	0	0	0	1	2	0	13
Lexington	0	------	0	0	0	0	0	0	0	0	19
Tennessee:											
Knoxville	2	------	0	0	3	0	0	0	3	0	32
Memphis	2	------	0	0	0	8	0	3	6	5	40
Nashville	0	------	0	0	1	1	0	3	0	0	40
Alabama:											
Birmingham	0	------	1	0	5	1	0	1	4	0	53
Mobile	0	------	0	0	0	0	0	1	0	0	23
Montgomery	1	------	------	0	------	1	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	------	0	0	------	0	0	------
Little Rock	0	------	0	0	1	1	0	1	0	0	2
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	1	7
New Orleans	0	------	5	3	7	6	0	20	3	3	183
Shreveport	0	------	0	0	3	2	0	2	1	0	38
Oklahoma:											
Oklahoma City	------	4	0	0	3	0	0	0	0	0	49

City reports for week ended Aug. 8, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	2	------	0	2	1	3	0	1	1	0	38
Fort Worth	1	------	0	0	3	0	0	3	1	0	42
Galveston	0	------	0	0	2	0	0	1	0	0	15
Houston	4	------	0	0	7	1	1	2	1	0	75
San Antonio	4	------	0	1	7	0	0	6	2	0	78
Montana:											
Billings	0	------	0	0	2	0	0	0	1	0	8
Great Falls	0	------	0	1	1	0	0	0	0	0	6
Helena	0	------	0	0	1	0	0	0	0	0	3
Missoula	0	------	0	0	0	0	0	0	0	0	3
Idaho:											
Boise	0	------	0	1	0	1	0	0	0	0	10
Colorado:											
Colorado Springs	0	------	0	0	1	1	0	0	0	0	10
Denver	2	------	1	2	4	1	0	3	0	27	71
Pueblo	0	------	0	0	0	2	0	0	0	0	7
New Mexico:											
Albuquerque	0	------	0	0	0	1	0	4	1	6	12
Utah:											
Salt Lake City	0	------	0	3	2	2	2	2	0	16	20
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	7	0	1	0	4	0	5	87
Spokane	0	1	1	2	0	4	0	1	0	6	31
Tacoma	0	------	0	0	0	1	0	0	2	3	22
Oregon:											
Portland	0	------	0	1	4	5	0	2	0	7	62
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	7	7	0	11	12	9	0	16	3	40	303
Sacramento	0	------	0	1	0	8	0	3	4	2	32
San Francisco	1	------	0	10	5	6	0	9	1	5	158

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Georgia:			
Boston	0	0	1	Atlanta	2	0	0
New York:				Tennessee:			
New York	10	4	5	Memphis	0	0	3
Syracuse	0	0	1	Nashville	0	0	1
Pennsylvania:				Alabama:			
Pittsburgh	1	0	2	Birmingham	0	0	5
Ohio:				Louisiana:			
Cincinnati	0	1	0	New Orleans	0	0	1
Cleveland	2	1	1	Texas:			
Illinois:				Dallas	0	0	1
Chicago	1	0	1	San Antonio	1	0	0
Michigan:				Montana:			
Detroit	0	1	3	Billings	1	0	0
Missouri:				Washington:			
St. Joseph	2	0	0	Seattle	0	0	1
Maryland:				Spokane	0	0	1
Baltimore	1	0	0	California:			
Virginia:				Los Angeles	0	1	4
Norfolk	1	1	0	San Francisco	2	1	0
West Virginia:							
Huntington	0	0	1				

Epidemic encephalitis.—Cases: New York, 3; Pittsburgh, 2; Kansas City, 1; Albuquerque, 1
Pellagra.—Cases: Savannah, 2; Nashville, 1; New Orleans, 1; San Francisco, 3.
Typhus fever.—Cases: Atlanta, 1; Brunswick, 1; Savannah, 5; Birmingham, 2; Dallas, 1.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—May 1936.—During the month of May 1936, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	1		Paratyphoid fever	4	1
Cerebrospinal meningitis	12	1	Poliomyelitis	11	3
Chicken pox	319		Puerperal fever	39	12
Diphtheria	1,751	103	Scarlet fever	2,492	56
Dysentery	12	2	Trachoma	100	
Influenza	182	6	Typhoid fever	275	22
Lethargic encephalitis	4	3	Typhus fever	49	
Malaria	322	1			

LATVIA

Communicable diseases—April–June 1936.—During the months of April, May, and June 1936, cases of certain communicable diseases were reported in Latvia as follows:

Disease	April	May	June	Disease	April	May	June
Botulism		2	4	Paratyphoid fever	13	14	16
Cerebrospinal meningitis	20	15	7	Poliomyelitis	1	2	2
Diphtheria	36	68	53	Puerperal septicemia	13	13	16
Epidemic encephalitis	1			Scarlet fever	285	226	198
Erysipelas	31	40	41	Tetanus		4	5
Influenza	134	95	46	Trachoma	68	33	26
Leprosy	4	2	2	Tuberculosis	268	352	296
Malaria	1	1	1	Typhoid fever	40	51	39
Measles	323	497	271	Whooping cough	93	62	37
Mumps	6	11	7				

MEXICO

Mexico, D. F.—Paratyphoid fever.—According to information dated August 13, 1936, a marked increase in the number of cases of paratyphoid fever was noted. Some cases occurred among tourists in Mexico, D. F., Mexico.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended—												
						May 1936					June 1936				July 1936			
						2	9	16	23	30	6	13	20	27	4	11	18	25
Ceylon:																		
Batticaloa [1]																		
Provinces	C				18													
India	C	14,233	13,729	16,605	24,028	4,542	4,613	4,172	4,116	3,835	4,111	3,861	3,837	3,452				
	D	7,799	7,183	7,988	11,745	2,285	2,201	2,112	2,120	1,916	2,098	2,010	1,793	1,771				
Assam	C	318	92	59	137	75	124	115	98	157	86	98	41	37	31	16	47	57
	D	167	46	30	65	37	51	65	49	90	46	41	49	16	25	11	26	13
Bassein	C							3		6	6	3	1	2	1			
Bombay Presidency	C	459	332	130	145	63	87	85	130					592	552	666		
	D	237	149	55	42	25	27	34	37					224	242	270		
Bombay	C										[2] 1					[2] 1		
Calcutta	C	140	380	802	799	161	192	268	225	166	191	133	180	76	52	39	37	26
Central Provinces and Berar	C	14	56	217	357	38	23	163	184	307	279	404	288		241	306	367	435
Chittagong	C					4	1			1		7	1	5	2		3	
Madras Presidency	C	3,870	2,877	2,751	1,677	265	221	292	346	432	501	479	600	484				
	D	2,013	1,407	1,340	758	146	116	158	187	180	226	233	245	198				
Madras	C	9	70	26	5		1	1								2	4	
	D	3	26	11	1												1	
Moulmein	C		2	10	2	1		2			1							
Negapatam	C	22	56	6	2									13	9	1	1	4
	D	8	27	2										9	4		1	2
Northwest Frontier Province	C	1	1															
Punjab	C	1			6	3	5	3	15	35	35	61	54	81	50	93	118	157
Rangoon	C	[2] 1			4							[2] 1		1	1	2		
Tuticorin	C															12	14	3
India (French):																		
Chandernagor Territory	C	8	6		6	1	1					6		1	2			
Karikal Province	C	116	91		4									8	8			
Pondichery Province	C	44	52	74	7	10	6					4			1			
Indochina (see also table below):																		
Bentre	C						1											

Pnom-Penh	C						1											
Siam:																		
Bangkok	C	124	375	148	59	20	8	11	3	10	8	6	10	12	7	7	3	5
Provinces	C	554	977	961	649	145	82	47		14	10	9	9	6	21	22	6	17
On vessels:																		
S. S. *Egra* at Rangoon	C	1																
S. S. *Floristan* at Masulipatam	C	[2] 1																
S. S. *Chatala* at Rangoon from Chittagong	C			1														
S. S. *Kutsang* at Penang from Calcutta	C				1													
S. S. *Karagola* at Penang from Calcutta	C						1											
S. S. *Ekma* at Rangoon from Calcutta	C											1						

Place		February 1936			March 1936			April 1936			May 1936			June 1936		
		1-10	11-20	21-29	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30
Indochina (French) (see also table above):																
Cambodia [4]	C	4	7		4	4	3		2			3	1	1		1
	D	3	1		4	3	3		1			2	1	1		1
Cochinchina [4]	C	2		3	3	4	1	4		1	1	1	1		4	1
	D	2		3	3	4	1	3		1	1	1	1		4	

[1] According to information dated Apr. 8, 1936, 31 cases of cholera with 27 deaths have occurred in the vicinity of Batticaloa, Ceylon.
[2] Imported.
[3] Suspected.
[4] Reports incomplete

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended— May 1936: 2	9	16	23	30	June 1936: 6	13	20	27	July 1936: 4	11	18	25
Algeria: Bone	C				[2] 3													
Argentina[3] (see also table below): Bahia Blanca (vicinity of)	C		2															
	D		2															
Azores. (See table below.)																		
Basutoland. (See also table below)	C		[4] 2															
Belgian Congo	C							1										
Brazil.[5] (See also table below).																		
British East Africa:																		
Kenya	C	10	22	9	11	8	2	21	5	6	9	11	12	7	4			
Tanganyika	C	7	2	5		3												
Uganda	C	44	44	62	57	23	17	43	42	28	31	16		29	25	24		
	D	40	42	58	55	22	16	42	40	28	29	16		28	25	22		
Ceylon:																		
Anuradhapura	C			1														
Colombo	C	10	6	3	3	2				1		3				1	2	
	D	9	3	3	3	2				1		3				1	2	
Plague-infected rats			2	3	8	2		1		5		2			1			
Hatton	C							3										
Manar	C				1													
Maskiliya	C																	1
Weligama	C				1													
Dutch East Indies: West Java	C	726	996	700	604	122	107											
	D	723	990	689	602	121	106											
Ecuador:																		
Daule[6]	C			1														
Guayaquil	C	8	6	1	1													
	D	6	3		1													
Plague-infected rats		2		1									1	2	1	3	1	
Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P	P		P		P		P		P		P		
Asyut Province	C	6	9	13	18	1	1				2							
Girga Province	C	1	2	1	1				1									
Minya Province	C		4	5	1	1												
Suez	C										1							

Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district:[7]																		
Hamakua Mill			1															
Paauhau Sector[8]		1				2											2	1
Pohakea Sector			1		4													
India	C	2,168	3,382	3,543	2,334	350	154	63	34	25	34	29	52	24				
	D	1,144	1,726	1,669	1,225	192	115	55	24	20	26	18	34	14				
Bassein	C		7	4	5		1	2	1	1	1	1			2	4	3	
Plague-infected rats			2															
Bombay Presidency	C	99	169	125	68	7	4						4					
	D	61	110	70	47	3	2		1				2					
Bombay	C	[9]1											1					
Calcutta	C														[9]1			
Central Provinces and Berar	C	194	584	456	487	45	6	1								1	2	6
Karachi	C			5														
Madras Presidency	C	42	29	44	20	1		2	2	1						2		
	D	26	11	38	13			1	1									
Punjab	C		1	14	95	56	1	8	7									
	D			7	53	36	1	7	3									
Rangoon	C		[9]1				3		2				2					2
Plague-infected rats			5	2					1									1
Indochina (see also table below):																		
Longxuyen	C											1						
Pnom-Penh	C	1	1				1											
Saigon-Cholon	C	1			1													
Tanghai	C				2				4									
Iraq: Baghdad	C	[9]1																
Madagascar. (See table below.)																		
Malta	C				3	1					3							
	D				2						1							
Peru. (See table below.)																		
Senegal. (See table below.)																		
Tunisia: Tunis—Plague-infected rats			2		2									1		1		
Union of South Africa	C	44	144	41	[10]6		[10]3		[10]3		[10]17		[10]15		[10]1			
United States:																		
California:																		
Lassen County—Plague-infected squirrels											1	1		3	1			
Modoc County—Plague-infected squirrels											P	4	7	[11]2	3	1		
Monterey County	C													1				
Santa Cruz County—Plague-infected squirrels													21	[11]29	5			6
Santa Rosa	C				1													
Ventura County—Plague-infected squirrels					1						P							

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Information dated Aug. 5, 1936, states that 4 cases of plague had been reported at Salta Province and 1 case at Tucuman Province, Argentina.
[4] Includes 1 suspected case.
[5] During the week ended Aug. 15, 1936, 2 cases of bubonic plague were reported at Santos, Brazil. On July 29, 1936, 23 cases of pneumonic plague, with 18 deaths, were reported in Sao Paulo, Brazil.
[6] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Daule and vicinity, Ecuador.
[7] During the week ended Aug. 8, 1936, 2 plague-infected rats were reported at Hamakua District, Island of Hawaii, Hawaii Territory.
[8] Plague-infected rats have also been reported at Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, as follows: Week ended Aug. 8, 1936, 1 rat, and week ended Aug. 15, 1936, 1 rat.
[9] Imported.
[10] For 2 weeks.
[11] During the week ended June 27, 1936, 3 lots of plague-infected fleas in Modoc County, and 7 lots of plague-infected fleas in Santa Cruz County, Calif., were also reported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended— May 1936 2	May 9	May 16	May 23	May 30	June 1936 6	June 13	June 20	June 27	July 1936 4	July 11	July 18	July 25
United States—Continued.																		
Idaho: Bonneville County—Plague-infected squirrels												P		7				
Montana: Beaverhead County.[12]																		
Nevada: Elko County—Plague-infected squirrels							P											
Utah: Beaver County[13]	C														1			
Plague-infected squirrels																	1	
On vessel.[14]																		

Place		January 1936	February 1936	March 1936	April 1936	May 1936	June 1936
Argentina (see also table above):							
Buenos Aires Province	C		2				
Cordoba Province	C	1					
San Luis Province	C				6		
Santa Fe	C	1					
Azores	C	3	4		2	2	
Brazil:							
Ceara State	C		7	54	1		
Pernambuco State	C			[15] 15			
Indochina (see also table above):							
Cambodia	C	1	2	1	1	1	
Cochinchina	C	1			1	1	1
Madagascar (central region)	C	503	382	206	96	48	
	D	485	355	196	95	47	
Peru	C	23	19	10	15	5	2
Arequipa Department	C	5					

Place		January 1936	February 1936	March 1936	April 1936	May 1936	June 1936
Peru—Continued.							
Lambayeque Department	C	4	3				
Libertad Department	C	5	1	1	6	4	1
Lima Department	C	9	8	3	6	1	
Callao	C	1	2	4	1		1
	D	1	2	1	1		1
Plague-infected rats				P			
Piura Department	C		5		2		
Trujillo Department	C			2			
Senegal:							
Dakar[16]	C	1	1				2
	D	1	1				2
Thies[16]	C					2	1
Tivaouane[16]	C				1	5	4
South-West Africa. Ovamboland	C					23	

[12] During the week ended July 25, 1936, 153 fleas and 26 lice taken from 7 marmots (ground hogs) shot at the head of Small Horn Canyon, Beaverhead County, Mont., were reported plague infected.
[13] During the week ended Aug. 1, 1936, 1 plague-infected marmot (ground hog) was reported in Beaver County, Utah.
[14] A report dated Aug. 11, 1936, states that 2 cases of bubonic plague were found on a vessel at Marseille, France.
[15] From Jan. 1 to Mar. 16, 1936.
[16] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended—												
						May 1936					June 1936				July 1936			
						2	9	16	23	30	6	13	20	27	4	11	18	25
Algeria:																		
Algiers Department	C		2															
Constantine Department	C				1						1			1	1			
Oran Department	C										1		5		1	1		
Angola. (See table below.)																		
Argentina (see also table below):																		
Corrientes Province	C			5														
Jujuy Province	C			7														
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil: Porto Alegre (alastrim)	C	12																
	D	1			3													
British East Africa:																		
Tanganyika	C	9	8	57			11	61	1			1	6		20	44		
Uganda	C	10	12	7														
British Somaliland	C	4	34					6	2	2	1	10	6	2				
British South Africa: Southern Rhodesia	C		1															
Canada:																		
Alberta	C	[1]1	3	30	1	1	1					[1]2						
British Columbia	C	2		[1]1														
Ontario	C				[1]1													
Saskatchewan	C																	[1]2
Ceylon: Colombo	C	1																
China (see also table below):																		
Amoy	C		3		1									3		1		
Canton	C				1													
Dairen	C		4	2	3	2	2	1	3	2	4		2	3				
Foochow	C	P	P	P	P	P				P		P		P		P		
Hangchow	C	3	15	8	5	2	2	2			1	1	2		1			
Hankow	C		4	1	2		1				1							
Hong Kong	C			6	7	1	1			3	2					1		1
Nanking	C	16	41	38	79	27	12	18	10	8	1		7	8	4			
Shanghai	C	5	30	23	50	11	9	10	9	10	1	9	4	3	3	6	3	2
Swatow	C		2	1	4													
Tientsin	C			2	1				1			2	1		1			

[1] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended— May 1936: 2	9	16	23	30	June 1936: 6	13	20	27	July 1936: 4	11	18	25
Chosen. (See table below.)																		
Colombia (see also table below)	C	68	13	38	30					[1] 60								
Dahomey. (See table below.)																		
Dutch East Indies: Palembang	C			1														
Ecuador. (See table below.)																		
Egypt: Provinces	C		2	5									1	1				
Eritrea	C		1	5	2													
Asmara	C				1													
Finland.[2]											4							
France. (See table below.)																		
Gambia	C														38			
Great Britain: England and Wales—London and Great Towns	C					3		1										
Greece: Salonika	C	6	14	20	20	5	8	8	8	8	8		13	13	13			
Guatemala. (See table below.)																		
India	C	19,883	31,355	31,312	34,748	8,667	7,400	7,401	7,458	5,935	4,635	4,110	4,191	3,461				
	D	4,220	8,417	7,679	9,091	2,121	1,913	2,190	1,536	1,756	1,426	1,226	1,061	983				
Assam	C	116	798	321	219	36	112	35	34	53	33	13	32	17	14	9	18	13
Bassein	C	[3] 1																
Bombay Presidency	C	1,703	3,444	2,820	2,859	773	592	565	374	443	215	204	270	183	233	149	189	
	D	252	650	556	560	124	111	90	88	79	41	51	68	32	41	34	33	
Bombay	C	56	266	277	322	63	45	43	47	39	22	22	35	20	10	18	12	6
	D	49	149	157	195	40	31	24	38	22	14	12	29	13	9	11	5	3
Calcutta	C	270	1,606	1,305	1,552	200	126	100	77	64	70	133	40	32	27		13	6
	D	133	893	645	1,166	158	103	86	67	52	49	64	27	28	24		10	4
Central Provinces and Berar	C	1,266	2,652	2,109	2,826	661	563	665	585	569	403	389	308		147	155	115	60
Chittagong	D	1	1		1									3	11			
Cochin	C		21	7														
Karachi	C	17	77	28	36	6	5	3	1	4	2	1	1	1	1		1	
Madras Presidency	C	1,312	1,214	1,980	1,236	271	252	222	272	208	191	219	206	180				
	D	176	191	294	214	58	38	28	53	38	44	22	43	28				
Madras	C	3	3	12	1	1			3	1								
Moulmein	C	27	61	83	35	2	9	7	11	6	6	8	7		5	4	6	3
Negapatam	C	3	2		3		1											
Northwest Frontier Province	C	26	50	1	21		5			6		5		11	7		4	4

Punjab	C	498	641	437	372	97	47	70	60	103	77	73	92	78	48	9	26	30
Rangoon	C	9	10	16	20				3	1	5		[1] 1	1	1			
Sind State	C				90	71	54	45	26	53	72	17	63	42	4	11	27	12
Vizagapatam	C	36	39	19	2		3		1	1		1		1				
India (French):																		
Chandernagor Territory	C	165	239		29	6	4						6	2				
Karikal Province	C	5			2													
Pondichery Province	C	13	4		2	1	1											
	D	7			2	1												
India (Portuguese)	C	1		9														
Indochina (see also table below):																		
Halphong	C		1															
Pnom-Penh	C												1				1	
Saigon	C				1													
Tourane	C			1	1	1												
Iran	C	9	12	1							1	4	1	1		1		
Iraq	C	58	40	9	10	1	4		1	5		1						
Baghdad	C	1			2	1												
Basra	C				3													
Japan:																		
Kobe	C				1													
Moji	C		1	1														
Nagasaki	C				1													
Osaka	C			5						1				1	1			
Yamaguchi Prefecture	C	1																
Yokohama	C									1								
Libya: Tripolitania	C	2																
Mexico (see also table below):																		
Chihuahua	C	1	1		2	2							2					
Guadalajara	D	13	46	39	33		4	5	8	4	1		3	2	1	1		1
Mazatlan	C		1	2														
Mexico, D. F	C	4	11	12	20										3			
Monterrey	C		2	2	1													
San Luis Potosi	D			1														
Torreon	C	1		2														
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	84	549	1, 697	509	343		84			27							
Lagos	C		2															
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C	875	70	46														
Peru. (See table below.)																		
Poland	C		1															
Portugal (see also table below):																		
Lisbon	C	3	5	5	3			1									1	1
Oporto	C											1						

[1] For 2 weeks.

[2] A report dated July 22, 1936, states that up to July 21, 1936, 19 cases of smallpox were reported in the Province of Uleaborg, Finland.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended— May 1936 2	May 9	May 16	May 23	May 30	June 1936 6	June 13	June 20	June 27	July 1936 4	July 11	July 18	July 25
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C		8		12	1	4	1										
Sierra Leone	C	37	135	215	9		[1] 9				[1] 11		[1] 14					
Freetown	C		1		[1] 1		[1] 2											
Spain	C	20	12	15	24	3	3		2	4		21		2				
Straits Settlements: Singapore	C												[3] 1					
Sudan (Anglo-Egyptian)	C	3	5	12	6	13	2	2					4	1				1
Turkey. (See table below.)																		
Union of South Africa	C														1			
Uruguay. (See table below.)																		

[1] For 2 weeks.

[3] Imported.

On vessels:

S. S. *Bankura* at Karachi	1 case	Jan. 4, 1936
S. S. *Jalgopal* at Rangoon from Aracan	1 case	Jan. 5, 1936
S. S. *Matua* at Suez from Calcutta	1 case	Jan. 21, 1936
S. S. *Khosrou* at Kamaran quarantine station	1 case	Feb. 15, 1936
S. S. *Karapara* at Rangoon from Calcutta	1 case	Mar. 9, 1936
S. S. *Egra* at Calcutta	1 case	Mar. 10, 1936
S. S. *City of Aukland* at Rangoon from Calcutta	2 cases	Mar. 15, 1936
S. S. *Khandalla* at Rangoon from Calcutta	1 case	Mar. 16, 1936
S. S. *Haishang* at Rangoon	1 case	Mar. 18, 1936
S. S. *Cranfield* at Madras from Calcutta	1 case	Mar. 27, 1936
S. S. *Hokuryo Maru* at Moji from Tientsin	1 case	Apr. 2, 1936

On vessels—Continued.

S. S. *City of Adelaide* at Colachel from Rangoon	1 case	Apr. 13, 1936
S. S. *Egra* at Rangoon from Calcutta	1 case	Apr. 13, 1936
S. S. *City of London* at Suez from Calcutta	1 case	Apr. 20, 1936
S. S. *Manipura* at Port Sudan from Calcutta	1 case	Apr. 23, 1936
S. S. *Kasagi Maru* at Moji from Shanghai	1 case	May 4, 1936
S. S. *Awaji Maru* at Nagasaki from Dairen	1 case	May 8, 1936
S. S. *Bhutan* at Kobe from Shanghai	8 cases	May 13, 1936
S. S. *Jinkai Maru* at Moji from Hongay	1 case	June 1, 1936
S. S. *Rohna* at Penang from Madras	1 case	June 11, 1936
S. S. *Maya Maru* at Moji from Shanghai	2 cases	June 18, 1936

Place		January 1936	February 1936	March 1936	April 1936	May 1936	June 1936
Angola	C	5	12	30	29		
Argentina (see also table above):							
Buenos Aires Province	C		4		7	12	
Entre Rios Province	C		5	1			
Jujuy Province	C			7	3	3	9
Belgian Congo	C	456	227	198	135	75	
Bolivia	C	48	18	62	18	31	8
China: Manchuria—Harbin	C	1	3			7	
Chosen	C	86	248	345	313	183	
Colombia (see also table above):							
Barranquilla	D		1	1			1
Santa Marta	D		1				
Dahomey	C		18	11			
Ecuador: Guayaquil	C		1				
France	C	76	24	30			
Guatemala	C	2	14	2	5	1	3
Indochina (see also table above)	C	57	229	196	221	142	78
	D	3	31	15	30	19	10
Mexico (see also table above):							
Aguascalientes State—Agascalientes	C		5	4	4	2	
Chiapas State	C	1					
Chihuahua State—Chihuahua	C			1			
Coahuila State—Torreon	C		1				
Colima State	C		1	1			
Guanajuato State	C	5		5			
Leon	C	1					
Mexico—Continued							
Jalisco State	C	109					
	D	28					
Guadalajara	C	85	115	70	39	37	
	D	24	50	43	34	23	
Lower California	C		7			1	
Mexico State	C		2	4	6	4	
Mexico, D. F	C	10	22	18	13		
Mexico City	C	9				26	
Morelos State	C			1			
Puebla State	C	2	9	2			
Puebla	C		8	2	1	2	
Quintana Roo	C			1			
San Luis Potosi State—San Luis Potosi	C			8			
Sonora State	C		1	1	1		
Tamaulipas State	C	8					
Tlaxcala State	D			1			
Morocco	C	9	1	2	15	6	3
Mozambique	C	3	1	2	5		
Nyasaland	C	3	50	1	3		
Peru	C	31	7	21	30	21	
Portugal (see also table above)	C	103		49	16		
	D	6		8			
Portuguese East Africa	C	3					
Salvador	C	32	46	13	39	45	
Turkey	C	5	6	1	1	10	
Uruguay	C	3					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935–Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Week ended— April 1936				May 1936					June 1936				July 1936		
					4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
Algeria:																				
Algiers Department	C	4	31	64	31	26	15	5	21	11	38	2	8	3		74	8	12	16	24
Algiers	C	1									2	1	1	1		2				1
Constantine Department	C	25	60	49	22	16	6	18	5	34	8	9	5	5		14	5	9	22	5
Bone	C	1								1										
Constantine	C	3		1						2				1						2
Philippeville	C													1						
Oran Department	C	7	53	12	4	12	1	15		5	7					6	2	1		
Australia: Sydney	C	1								1										
Basutoland	C			[1] 3																
Bolivia. (See table below.)																				
Bulgaria	C	14	11		16	14		17												
Chile	C		430	235					[3] 199						[3] 248					
Valparaiso	C	12	29	8	1	4	6	1				1	1	3	1			1	1	
China:																				
Hankow	C			1		1		2				2		1			4	1		
Nanking	C					1												1		
Shanghai	C								1		1	1		3	3	1				
Tientsin	C		1	1			1			1		3		2		2		5		
Tsingtao	C		1	1									1							
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	1		8			1				1							1	1	
Asyut Province	C		7	2	1						2									2
Beheira Province	C	28	82	103	49						28			35						8
Cairo	C	1	11	1	3		2	1	5	1		2			1			1	1	1
Dakahliya Province	C	1	35	14	6						15			9						1
Faiyum Province	C																			1
Gharbiya Province	C	46	78	131	33						32			27					5	
Girga Province	C	1			1														1	
Minufiya Province	C		30	18							2			2					1	
Port Said	C										1									
Qena Province	C		3	25	20						1			1						
Sharkiya Province	C	1	1	13							2									7
Suez	C																1			
Provinces	C	138	371	372	119	159	153	132	109	101	107	106	98	93	72	76	95	80	21	20

Finland. (See table below.)																				
Greece (see also table below): Salonika	C	3	9	24	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C			7						1									1	1
Hungary	C	3		7	2	2			1											
Iran	C	17	9	9	7	8	7	3	5	6	2	7	1	5	6	4	2			
Teheran	C	1		4	2	2	6	1												1
Iraq	C	19															1			
Irish Free State:																				
Galway County:																				
Bothar Buidhe	C																1		1	
Oughterard	C																		1	1
Mayo County	C					2			1											
Japan	C	1																		
Latvia. (See table below.)																				
Lithuania	C	69	9	13		18		12			4			2	9					
Mexico (see also table below):																				
Mexico, D. F.	C	35	71	42	13	14	6	11										3		
San Luis Potosi	D		1													1				
Morocco (see also table below)	C	39	37	5	4	1	29	5	5	13	4	1	5	2		3	2	2	4	
Palestine: Haifa	C	3	2		1							7	1	2	1	[4] 9	1	[4] 2	1	1
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	382	671	619	134	129	113	143	148	139	104	110	86		85	45	33	51	44	27
	D	24	48	39	2	11	9	7	8	11	7	4	5		4	3	5	1	3	4
Portugal (see also table below): Oporto	C			1																
Rumania. (See table below.)																				
Spain: Catalonia	C																	1		
Straits Settlements: Singapore	C	3		2			1													
Syria: Beirut	C		[4] 2																	
Trans-Jordan	C	6	11	6	5	5														
Tunisia:																				
Tunis	C	5		9	1	1	1	1	1	1		1			2		1			1
Provinces	C	61	64	138	14	37	26	50	27	18	29	22	18	10	21		18	7	17	7
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Rotterdam from Algiers	C										1									

[1] For 2 weeks. [2] For 5 weeks. For 6 weeks. [4] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

TYPHUS FEVER—Continued

[C indicates cases: D, deaths; P, present]

Place		January 1936	February 1936	March 1936	April 1936	May 1936	June 1936
Bolivia	C	135	115	110	75	33	46
China: Manchuria—Harbin	C	1	5	9		33	
Chosen	C	51	128	259	312	225	
Czechoslovakia	C	14	25	219	99	49	
Finland	C			5	112	10	
Greece (see also table above)	C	5	7	6	5	3	4
Guatemala	C	9	17	6	114	116	59
Latvia	C			5			
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C		5	5	5	5	
Durango State	C		1	1			
Guanajuato State	C	15		56	2		
Leon	C	7	16	20			
Mexico State	C		2	15	6	6	
	D		3			2	
Mexico, D. F.	C	86	73	52	40		
Mexico City	C	75			20	26	
	D	22				15	
Oaxaca State	C	1	2				
Mexico (see also table above)—Con.							
Puebla State	C	1					
Puebla	C		2	3	3	3	
Queretaro State	C	3				1	
San Luis Potosi State: San Luis Potosi	C	8	6	6	3	3	
Tlaxcala State	C			1			
Morocco (see also table above)	C	45	30	7	45	26	9
Panama Canal Zone	C	2	1	1			2
Peru	C	143	103	118	103	118	
Portugal (see also table above)	C	1	1	1	1		
Rumania	C	572	905	1,581	1,587	1,143	
Turkey	C	33	51	33	79	39	
Istanbul	C	5	4	4	1	1	1
Union of South Africa:							
Cape Province	C	36	57	39	48	71	
Natal	C	7	2	3	1	2	
Orange Free State	C	17	21	5	18	10	
Transvaal	C	1	13	3	3		
Yugoslavia	C	131	80	113	106	125	

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 29, 1935, Jan. 25, 1936	Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Week ended— April 1936 4	11	18	25	May 1936 2	9	16	23	30	June 1936 6	13	20	27	July 1936 4	11
Bolivia: Santa Cruz Department:[1]																			
Brazil:[2]																			
Amazonas State	C			1					1		1	1							
Bahia State	C	2																	
Maranhao State	C												1						
Matto Grosso State	C	1	2	1		1		1								1			
Minas Geraes State	C	8	11	7		1	1		1			3	1	1					
	D	8	11	7		1	1		1			3	1	1					
Parana State [2]	C		9	19	1	2													
Sao Paulo State [2]	C	4	23	35	[3] 3				1	1	6	6	2	2	3	1			
Colombia:																			
Boyaca Department	C		3																
Intendencia of Meta	C		3																
Dahomey	C																		[4] 1
Gold Coast:																			
Koforidua	C						1												
Kumasi	C		1	1															
Prepraw se	C					1													
Ivory Coast: Vavua	C				1														
Niger Territory: Fada N'Gourma	C						1												
Senegal:																			
Thies	C															1			
Tivaouane	C													1	1				
Sudan (French): Kayes	C																	[4] 1	

[1] Yellow fever has been reported in Bolivia as follows: For the month of February, 2 cases; March, 10 cases; April, 1 case; May, 1 case; June, 2 cases.
[2] Yellow fever has also been reported in Brazil as follows: Parana State, Feb. 16–25, 1936, 5 cases, 5 deaths, Sao Paulo State, no date given, 3 cases and 4 deaths. Mar. 24–31, 1936, 2 cases, 2 deaths.
[3] Includes 1 case of yellow fever reported in the city of Sao Paulo, Brazil.
[4] Suspected.

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UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 SEPTEMBER 4, 1936 NO. 36

ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

XII. NORMAL BUTYL ACETATE [1]

By R. R. Sayers,[2] H. H. Schrenk,[3] and F. A. Patty [4]

This report on the acute response of guinea pigs to normal butyl acetate ($CH_3.CH_2.CH_2.CH_2.COOCH_3$) vapor in air is the twelfth of a series of similar reports (*1*) [5] which deal with studies pertinent to establishing a criterion of the toxicity of some commonly used commercial products with those which have recently become commercially available for industrial application.

This investigation was undertaken at the request of Stanco, Inc., and was conducted jointly by the United States Bureau of Mines and that company at the Pittsburgh Experiment Station of the Bureau of Mines.

SCOPE OF WORK

The work included a study of the toxicity and physiological response of guinea pigs exposed to normal butyl acetate vapor in air. Only acute effects as produced by a single exposure were studied. The experiments were planned to cover a range of concentrations and periods of exposure which produce but slight or no response, moderate response, and serious response.

CHEMICAL AND PHYSICAL PROPERTIES

The normal butyl acetate ($CH_3.CH_2.CH_2.CH_2.COOCH_3$) used in this study was a commercial grade sold for industrial usage. It was water clear and had an agreeable odor in very low concentrations but was disagreeable in the range of concentrations studied.

[1] Contribution from the Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa. Published by permission of the Director, U. S. Bureau of Mines. Work completed on manuscript June 26, 1935.

[2] Surgeon, U. S. Public Health Service, and formerly chief, health and safety branch, U. S. Bureau of Mines.

[3] Chemist in charge, toxicological and biochemical laboratory, health laboratory section, Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa.

[4] Associate chemist, health laboratory section, Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa.

[5] Figures in italic denote reference cited.

A determination of the specific gravity and boiling range of this material gave the following results:

Specific gravity

15.6°/15.6° C ---------- 0.8771

Boiling range

Distillate, cumulative (percent)	Temperature °C. corrected to 760 mm	Distillate, cumulative (percent)	Temperature °C. corrected to 760 mm
Initial boiling point	115.9	60.0	124.5
1.0	116.9	70.0	125.2
2.0	117.9	80.0	126.0
3.0	118.4	90.0	126.7
4.0	119.1	95.0	127.7
5.0	119.4	97.0	129.0
10.0	120.5	98.0	130.0
20.0	121.5	99.0	132.0
30.0	121.9	99.5	136.0
40.0	122.7	99.9	141.1
50.0	123.8		

Recovery 99.9 percent; residue 0.1 percent.

These values agree closely with the specifications furnished by the manufacturer for this commercial product.

The boiling point of normal butyl acetate as given in the International Critical Tables (*2*) is 126.5° C.

Normal butyl acetate is an organic solvent used in the preparation of lacquers.

TEST APPARATUS

The apparatus for preparing normal butyl acetate vapor-air mixtures and for exposing animals was the same as that described in a previous report dealing with butanone (*1*).

COMPUTATION AND ANALYSIS OF VAPOR-AIR MIXTURES

The method of computation and analysis is the same as that described in the report on secondary amyl acetate (*1*). Table 1 gives the results of analysis of a standard alcoholic solution of normal butyl acetate made to check the accuracy of the method of analysis.

TABLE 1.—*Results of analysis of portions of standard alcoholic solution of normal butyl acetate*

Normal butyl acetate taken (milligrams)	Normal butyl acetate found (milligrams)	Recovery (percent)
50	47.4	94.8
50	48.0	96.0
100	89.9	89.9
100	90.2	90.2
100	93.0	[1] 93.0

[1] Average 92.8.

An average recovery of 92.8 percent was obtained. The values obtained for the amount of normal butyl acetate in the vapor-air mixtures used in animal exposures (table 2) were corrected by multiplying the determined value by 100/92.8, or 108.9.

Table 2 gives the values for the concentrations as computed from the volume of air and amount of normal butyl acetate vaporized, and the concentrations found by chemical analysis of vapor-air mixtures used in animal experiments. The calculation of the percent by volume was made on the basis that 1 gram molecular weight of normal butyl acetate is equivalent to 22.4 liters of vapor at 0° C. and 760 millimeters mercury pressure.

TABLE 2.—*Results of analysis of atmospheres used for exposing animals* [1]

Concentration by—		Concentration by—	
Computation	Analysis	Computation	Analysis
(2)	1.38	0.64	0.66
(2)	1.40	.65	.71
(2)	1.36	.30	.33
(2)	1.47	.29	.33
(2)	1.40	.29	.31
0.63	.69	.30	.30
.63	.67	.30	.31
.63	.62		

[1] Concentration in percent by volume at 25° C. and 760 mm pressure. To convert to milligrams per liter multiply by 53.2.
[2] Concentration obtained by recirculating air in a closed chamber at 30° C. and 740 mm pressure across wicks wet with normal butyl acetate. No computed concentration.

The maximum concentration attainable by recirculating air at 30° C. and 740 millimeters pressure over large surface wicks wet with normal butyl acetate in a closed chamber averaged approximately 1.4 percent. The remainder of the results in table 2 represent experimental atmospheres prepared by continuously volatilizing a measured amount of normal butyl acetate in a measured volume of air sufficient to give 2 to 3 air changes per hour in the experimental chamber. Tests have shown that this rate of change in the apparatus used is ample to prevent oxygen deficiency or significant increase in carbon dioxide percent. The general order of concentrations used in the experiments was 1.4, 0.7, and 0.33 percent by volume.

TEST PROCEDURE; DESCRIPTION AND CARE OF ANIMALS

The test procedure and description and care of animals were the same as described in the report on butanone (*1*).

RESULTS OF TEST

This report presents summarized results pertinent to signs or objective symptoms, fatality, and gross pathology.

OBJECTIVE SYMPTOMS

Control animals.—No signs or symptoms were exhibited by the 18 control guinea pigs taken at random from the stock animals used in these experiments. No deaths occurred.

Exposed animals.—The signs or symptoms exhibited by animals exposed to normal butyl acetate vapor, in the order of their occurrence, were as follows: Irritation of the nose and eyes, manifested by rubbing nose with the forepaws and squinting; lacrimation; incoordination; narcosis; respiratory disturbances (gasping); and death. Table 3 gives the average time necessary to produce the symptoms by various concentrations of normal butyl acetate vapor in air. The figures given indicate the average time for occurrence of the sign or symptom, excepting those in parentheses, which indicate that the particular sign or symptom did not occur in the maximum period of exposure as given.

TABLE 3.—*Signs and symptoms produced in guinea pigs exposed to vapors of normal butyl acetate*

Type of symptom	Concentration of vapor in percent by volume		
	1.4	0.7	0.33
	Duration of exposure, minutes		
Nasal irritation (rubbing nose)	(1)	(1)	[2] (810)
Eye irritation (squinting)	(1)	(1)	5
Lacrimation	1	5	[2] (810)
Incoordination	2-4	420	[2] (810)
Narcosis (unconsciousness)	15-30	700	[2] (810)
Changes in respiration (dyspnea, gasping)	190	[2] (810)	[2] (810)
Death	240	[2] (810)	[2] (810)

[1] Occurred almost immediately after start of exposure.
[2] Not observed in the period of exposure given in parentheses.

With the exception of eye irritation no abnormal signs were observed during or following an exposure to 0.33 percent normal butyl acetate vapor in air by volume for 810 minutes. With exposure to 0.7 percent in air, irritation of the nose and eyes occurred immediately, lacrimation occurred in 5 minutes, incoordination in 420 minutes, and narcosis in 700 minutes, but no deaths occurred during or following an exposure of 810 minutes. The time for occurrence of these symptoms decreased rapidly with increase in concentration, and death was produced by an exposure to 1.4 percent vapor in air for 240 minutes.

GROSS PATHOLOGY

Control animals.—The 18 control animals killed for autopsy exhibited no significant gross pathology.

Exposed animals.—The gross pathological findings in animals that died during exposure (see fig. 1 and table 3) were moderate congestion of the brain, lungs, liver, and kidneys.

Exposure to conditions which produced marked incoordination and narcosis (1.4 percent for 90 minutes, and 0.7 percent for 810 minutes) produced slight to moderate congestion of the brain and slight congestion of the lungs, liver, and kidneys in animals killed immediately after exposure; but these findings were absent in animals killed for autopsy 4 to 8 days following exposure. No gross pathology was observed in animals exposed to 0.33 percent for 810 minutes.

SUMMARY OF FATALITY AND PHYSIOLOGICAL RESPONSE

The fatality and summary of the response of guinea pigs exposed to normal butyl acetate vapor in air is shown graphically in figure 1 and given in conventional degrees of response in table 4. The results

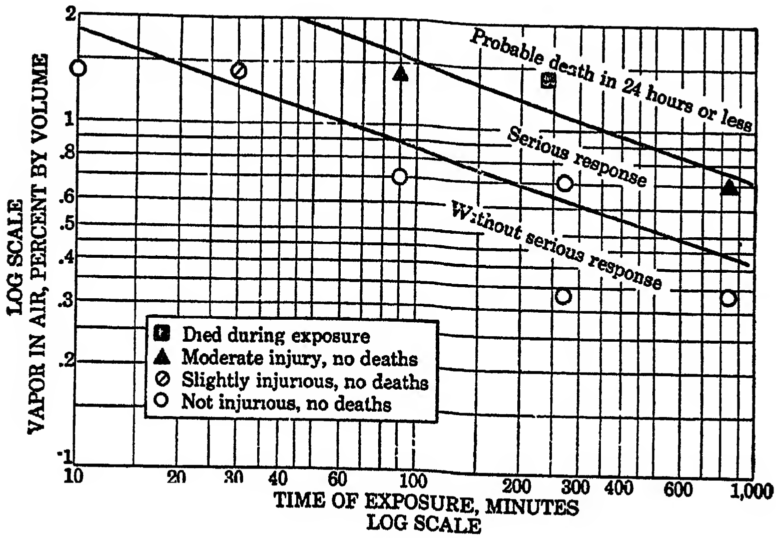

FIGURE 1.—Acute effects of exposure of guinea pigs to normal butyl acetate vapor in air.

of each experiment are designated by a symbol which represents one of four different degrees of severity. The symbols represent the most severe response for a majority, or at least three, of a group of six animals exposed to a given condition. The response of none of the animals deviated markedly from that which is representative of the group. In addition to representing the response of each group by symbols, the symbols have been separated into three general fields or zones of probable response.

Table 4 gives the concentrations (obtained by direct experiment or extrapolated from table 3 and fig. 1) which produce the degrees of response generally reported in the literature dealing with noxious gases. These data may be compared with toxicological data for other compounds (*1*, *3*, *4*, *5*, *6*, *7*, *8*, *9*).

TABLE 4.—*Acute effects of exposure of guinea pigs to normal butyl acetate vapor in air*

Acute effects of exposure after various periods of time	Concentration, percent by volume in air
Kills in a few minutes	(1)
Dangerous to life in 30 to 60 minutes	(1)
Dangerous to life after several hours	1.0–1.4
Maximum amount for 1 hour without serious disturbance	.7
Maximum amount for several hours with but slight or no symptoms	.33

1 Not produce by 1.4 percent vapor, the highest concentration obtained in a closed chamber by extended recirculation of air (30° C. and 740 mm pressure) over wicks wet with normal butyl acetate.

CAUSE OF DEATH

Death apparently was due to a state of narcosis which terminated in death rather than to the irritation of the lungs. No animals died following exposure; they either died during exposure or survived the exposure and the 4 or 8 day post-exposure observation period. In some instances the animals were unconscious several hours after termination of exposure (to 1.4 percent for 90 minutes and to 0.7 percent for 810 minutes) but appeared normal 24 hours after exposure.

WARNING PROPERTIES AND HAZARDS OF ACUTE POISONING

Men exposed to 1.4, 0.7, and 0.33 percent vapor in air even for a short time pronounced the atmosphere extremely disagreeable because of its strong odor and irritation to eyes and nasal passages. The latter concentration produced no marked symptoms and was apparently harmless to guinea pigs after one exposure of several hours.

WARNING PROPERTIES AND EXPLOSION HAZARDS

The explosion hazard of normal butyl acetate is minimized by the warning properties of concentrations below the inflammable range, but it cannot be ignored. A few determinations of the inflammable properties of the vapor of the normal butyl acetate used in this study indicated the lower limit to be approximately 1.7 percent.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing a commercial grade of normal butyl acetate ($CH_3.CH_2.CH_2.CH_2.COO$-CH_3) vapor was determined. The concentrations of the vapor ranged from those that produced death to those that produced no effect after several hours' exposure. The signs of response, the fatality, and the gross pathology are given, and the warning properties as observed by the exposure of persons are described.

1. Normal butyl acetate produces narcosis, terminating in death in the higher concentrations. The symptoms are principally those of eye and nasal irritation and narcosis. Animals that did not die during exposure recovered.

2. The principal gross pathological findings were congestion of the brain, lungs, liver, and kidneys, as observed in the autopsies performed immediately after exposure.

3. At room temperature it was not possible to attain a concentration that was dangerous to the life of guinea pigs in 30 to 60 minutes. Exposure to 1.0 to 1.4 percent vapor is considered dangerous to life of guinea pigs after several hours; 0.7 percent is the maximum amount for 1-hour exposure without serious disturbance other than eye and nasal irritation; and 0.33 is the maximum amount for several hours' exposure with but slight or no symptoms.

4. Commercial normal butyl acetate used in the experiments had a distinct odor and was markedly irritating to the nose and eyes of men in concentrations found to be apparently harmless to guinea pigs after a single exposure of several hours' duration. Concentrations of the vapor well below the estimated lower inflammable limit (approximately 1.7 percent) are extremely disagreeable to men from the standpoint of odor and eye and nasal irritation.

ACKNOWLEDGMENTS

This investigation was made under the immediate direction of W. P. Yant, supervising chemist, health laboratory section, United States Bureau of Mines. The pathological examinations were made by John Chornyak, formerly medical officer in charge, pathological laboratory, and S. H. Black, formerly assistant surgeon of the Bureau of Mines.

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TABULATION OF HEALTH DEPARTMENT SERVICES

Report of Committee on Records and Reports to State and Territorial Health Officers and the United States Public Health Service in Thirty-fourth Annual Conference, Washington, D. C., April 13–14, 1936

STATEMENT OF THE CHAIRMAN

At the last annual meeting of the State and Territorial health officers with the United States Public Health Service, a conference committee on records and reports was appointed. That committee, in its report to the conference, expressed the opinion that a broad subject such as records and reports for use by health agencies requires continuous study and adaptation of forms to changes in practice. The conference committee, after developing general principles which should be embodied in any system of records and reports, specifically recommended that a permanent committee be appointed to pursue the subject.

In the selection of the permanent committee on records and reports, an attempt was made to limit the membership to a group small enough for economical and effective operation, yet of sufficient number to provide representation for States portraying sectional differences in program and for representation of the two Federal agencies charged with administration of the public health provisions of the

National Social Security Act. Participation of special health interests has been secured through the appointment of consultants.

This committee did not become active until assured that funds would be available for making the Social Security Act effective. Since then two meetings have been held Between meetings a large amount of work has been accomplished through correspondence and informal conferences of smaller groups.

Obviously the entire subject of records and reports could not have been studied, much less acted upon, since the formation of this committee. It became necessary to make a selection of subjects for consideration. The members promptly decided that the development of the structure for a general administrative type of report would answer a previously existing need which had been accentuated by the passage of the Social Security Act. The group has addressed itself to this task for the past several months.

The conference will appreciate the difficult assignment given to this committee, since two extreme points of view are encountered whenever records and reports are under discussion These points of view are represented by those who are contented with nothing or with a few impressionistic statements of the workers themselves and by those who insist upon standardized forms and definitions which will portray the service in sufficient detail for critical analysis. These opposing views, as well as all gradations in between, represent definite convictions, however ill-founded they may be, which cannot be passed over lightly or brushed aside by mere fiat of this or any other committee.

It is the feeling of the members that perhaps some agreement can be reached on items of information which a local health officer may find necessary for the administration of his program. The first task undertaken was to list the services which might be found in local programs and to select items which would be descriptive of the whole. On the accompanying form the several services of health departments as well as the items selected for descriptive purposes are listed. This committee recognizes that all these services may not be performed by the health department in a given health jurisdiction and that in a few areas the program may contain additional elements. The inclusion or exclusion of a service is not to be construed as an expression of opinion concerning the proper content of a public health program.

It is hoped that the tabulation form, together with the accompanying set of definitions and instructions, may serve as the basis of a reporting system. The completed form or such sections as apply to local programs may be copied and filed with State and Federal agencies. Interpretative comments may be appended if desired. Perhaps an abbreviated list of items will, under certain

circumstances, satisfy the requirements of State and Federal agencies. This introduces no complication provided items are selected from the complete list. However, it will be necessary to follow the instructions and definitions if any degree of comparability in data between areas is to be obtained.

There has not been sufficient time to consider the items for the portraying of special services, such as industrial hygiene, mental hygiene, accident prevention, and other services which are being developed. Neither has there been opportunity to explore the more fundamental subject of basic health department records.

Before moving the adoption of this report, I wish to emphasize that there is being submitted for your consideration only one element in the system of records and reports; namely, a list of items to be tabulated by local health officers together with covering definitions and instructions. State and Federal agencies may select from this list those items which are considered necessary as a report of progress.

F. J. Underwood, *Chairman.*

COMMITTEE

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F. J. Underwood, *chairman*	Pearl McIver
J. W. Brown	K. E. Miller
E. S. Godfrey[1]	J. A. Milne
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DEFINITIONS AND INSTRUCTIONS FOR TABULATION OF HEALTH DEPARTMENT SERVICES[2]

GENERAL DIRECTIONS

Purpose of form.—The tabulation form to which these instructions and definitions apply is an instrument devised for use by local health departments in summarizing services. The items appearing on the form are considered necessary for describing the services to which they refer. As an aid to preservation, the pages of the form should be perforated in order that they may be inserted in a loose-leaf or ring binder.

Permissible adaptations.—A State or a given local health agency may choose to add sections if services not included in the form are being rendered or to supplement the list if the existing services are not adequately described for local administration purposes. In the event any service described by a section of the tabulation is not included in the local program, that particular section obviously need not be completed. However, there should be no changes in the wording

[1] Replaced by J. W. Brown.

[2] Definitions and instructions apply to Tabulation of Health Department Services, approved in 1936 by State and Territorial Health Officers, the United States Public Health Service, and the United States Children's Bureau.

or numbering of the items on the form except as approved by the State and Territorial health officers, the United States Public Health Service, and the United States Children's Bureau. Suggestions for altering the form or definitions and instructions should be sent to the chairman in order that they may be considered in the future when revisions are under discussion.

Reporting practice.—All items on the tabulation form may be required for reporting to a State or Federal agency; or at the discretion of the agency concerned, selected items may be used in lieu of the complete tabulation. If the tabulation form is used as a report, items which identify the report and describe the area should be completed, and the report should be signed by the health officer.

Report year.—The calendar year is recommended as the report year. For purposes of tabulation, the year is treated as a unit, and the enumeration is begun anew each year with the first service rendered. A person who is under care, supervision, or instruction at the close of one year and who is carried over into the following year or who returns at any time during the following year is considered new and should be counted again. The principle just described also applies to premises under sanitation service.

Enumeration of individuals and premises.—When either of the terms "individuals" or "premises" appears on the tabulation form, the service described is presumed to continue, perhaps with interruptions, during the year. Under these circumstances an individual or a premises should be counted only once during the year as the recipient of a given type of service.

Enumeration of individuals seen in groups.—Unless a case record is made for an individual receiving service through group activities, he is not considered as an individual admitted to service.

Enumeration of cases and admissions.—Either of the terms "cases" or "admissions" is used in the tabulation form for conditions which require attention for only a limited time. The condition rather than the individual is the basis of enumeration. If a person should be admitted for a condition which terminates, such as acute illness, pregnancy, etc., and should apply for the same service or a different service within the same year, that person is readmitted and counted a second time.

Enumeration of procedures.—Visits, inspections, examinations, treatments, and similar procedures are to be enumerated on the basis of each service when it is rendered, in keeping with the following circumstances:

A service is counted if it is rendered by an individual with professional training required for performing the service.

A service may be recorded for indirect contact with an individual or with a premises, such as a parent seen in behalf of a child, the owner of property regarding improvements, or other situations of similar character. A casual inquiry about the health of an individual or the condition of a premises or advice informally given should not be entered in the tabulation.

An actual entry of the service must be made on a case or premises record. An index card may, at the discretion of the health officer, be used in place of the more elaborate case or premises card, particularly if further service is not contemplated.

A single call at a home is to be counted as one visit if service is rendered to only one person, as two visits if two persons are served, and so on, provided an entry is made on the record of each individual. A service to a school child in school is not recorded as a field visit.

A single contact with an individual is to be recorded only once. A contact with an individual where two or more types of service are performed is to be recorded only one time, according to the primary purpose of the visit. If a chronic or continuing condition is complicated by an acute condition, then the individual preferably is classed as having received service for the acute condition.

When two staff members participate in a given service, the service is entered on the tabulation by one member only, preference being given to the staff member performing the major service.

A contact made by a technical supervisor should not be included in the tabulation unless such contact be for rendering special service in relation to a case or a premises.

As a general rule the premises forms the basis for enumerating field visits. However, when the visit involves a premises with several utilities, such as a hotel having a restaurant, a barber shop, and a swimming pool, or such as an amusement park having numerous concessions, a separate record is made of each utility or concession seen for a definite purpose and each contact is counted as a separate visit.

Service by whom to record.—The tabulation is intended primarily to express: (1) Service performed by the staff of the health department, (2) service performed by other agencies if administered or financed by the health department, and (3) action taken by citizens in observance of health laws or upon recommendation of the health department.

The tabulation is also intended to include a limited number of services which are complementary to the program of the health department, such as designated activities of private physicians and hospitalization of communicable disease and tuberculosis cases. These services are to be included irrespective of where budgetary or administrative responsibility may reside. When a private physician participates under direction in a program which is administered by the health department, his service is recorded in the same manner as prescribed for that of a regular staff member. A service of a physician to a private patient may be included where indicated on the tabulation form (visits to private physicians), provided an entry of the service is made on the record of the individual served and is filed in the health department.

Use of columns.—The five columns following the items of service are so arranged that the form is adaptable to tabulations or reports for various periods, including successive months, a calendar quarter, or an entire year. It is essential that each column bear a heading designating the period to which the figures apply. The following are examples of column headings that are acceptable, especially if the form is to be used directly as a quarterly or annual report:

Quarterly report

Total previous quarter	April	May	June	Total this quarter

Annual report

Total first quarter	Total second quarter	Total third quarter	Total fourth quarter	Total this year

In a report for the first quarter of the year the total for the last quarter of the preceding year should not be included. The quarterly totals in the annual report are not intended to be cumulative.

Educational services.—It is presumed that an educational influence pervades the whole program of the health department. Certain procedures susceptible to mass application, however, are set apart for special entry in the Tabulation of Health Department Services.

A "public lecture" or a "talk" is construed to mean the orderly presentation of information to a group. A classroom health talk is not to be included, as this type of instruction is an integral part of the school health program and should be tabulated separately. Attendance should be computed as accurately as possible.

A health class is more formal in character than a lecture or a talk; the term "class" implies that a definite number of individuals have agreed to pursue a course of instruction extending over a specified number of sessions. "Enrollment" is

the number registered for the entire course. "Attendance" is the sum of the numbers present at each session during the period under consideration. A person can be enrolled only once for a course; but when attendance is tabulated, the same individual should be counted each time present.

Medical conferences.—A medical conference may be described as a contact of an individual with a physician in the health department office or in a field station for the discussion of a personal health problem. A visit to a private physician does not fall in this category.

Visits to private physicians.—Visits to private physicians refer to visits by cases for whom there is an individual case record in the health department. As a rule, these individuals will also be receiving some service, commonly nursing, from the health department.

Office, clinic, or conference visits.—Office, clinic, or conference visits are contacts made by health department personnel with individuals in stations of the health department.

Field visits.—Field visits are contacts made by health department personnel with premises or with individuals at places other than stations of the health department.

SPECIFIC ITEMS

All items appearing in the Tabulation of Health Department Services are not included in the definitions which follow. The items selected for definition are representative of activities common to a number of services. Those items not included are considered self-explanatory.

A. Communicable Disease Control.

1. *Admissions to service* include persons who are ill with communicable disease, who are suspected of having communicable disease, or who are carriers of the causative organism, provided these persons are seen by the health department for purposes of care or control. Those receiving immunization services only are not counted under this item.

2. *Consultations with physicians* are visits by health department physicians to patients under the care of private physicians for purposes of assisting in the establishment of diagnoses or of giving professional advice of any type to the physicians in charge of the cases.

3–9. *Field visits* refer only to those made by the health department to diagnosed or suspected cases and to carriers. Spread and source contacts should not be included unless the visits reveal diagnosed or suspected cases or carriers.

10–14. *Admissions to hospitals* should include all cases and carriers of disease hospitalized, irrespective of the agencies operating the hospitals or of the influence of the health department in securing admissions.

15–20. *Immunizations* refer to those persons who received the approved dosage of the appropriate agent for active immunization. If more than one injection is required, the person should not be counted until the series is completed. For tabulation purposes, it is not necessary that immunity be confirmed by a test, although it may be desirable practice. Immunization service may be recorded when the work is performed by the health department or when performed by any other agent, provided pertinent facts are entered in the health department record for the individual immunized.

B. Venereal Disease Control.

1. *Admissions to medical service* include persons admitted for diagnosis and/or treatment at facilities of the health department. Prenatal cases, food handlers, diarymen, and other persons on whom Wassermann tests or urethral or cervical smears are made as part of routine physical examination are not included unless

formally admitted to venereal disease clinic facilities of the health department. Persons given prophylaxis for the prevention of venereal disease or advice in regard to sex hygiene are not included in this category but may be enumerated under "Other service" (B 5).

2. *Cases transferred to private physicians* are those included in the preceding item who are actually transferred to private physicians for treatment of venereal disease.

3. *Clinic visits* include only visits for diagnosis and/or treatment to health department facilities.

4. *Field visits* include all visits by the health department for purposes of control or care to venereal disease patients, contacts, and sources of infection.

C. Tuberculosis Control.

1. *Individuals admitted to medical service* are those admitted to diagnostic and/or treatment facilities of the health department for ambulatory patients.

2. *Individuals admitted to nursing service* are all diagnosed, arrested, and suspected cases visited by health department nurses. Contacts and persons with the childhood type of infection may be included if they are under active supervision and if definite service is rendered.

A "contact", for purposes of tabulation, is an individual admitted to service because of close association with a diagnosed or suspected case of tuberculosis. A "suspect" is a person on whom a positive diagnosis has not been made but who is placed under observation. An arrested case is classed as a suspect.

3. *Physical examinations in clinics* comprise all examinations and reexaminations, regardless of physical findings, made at diagnostic facilities of the health department. Such examinations may be for diagnosis or check on the progress of the disease. Examinations of contacts, suspects, and persons with the childhood type of disease should be included.

4. *X-ray examinations* should be counted according to the principle outlined under "Physical examinations" (C 3).

5, 7, 8. *Clinic visits, field nursing visits*, and *office nursing visits* refer to service contacts made between the health department staff and diagnosed, suspected, or arrested cases of tuberculosis. Visits to or by contacts and persons with the childhood type of infection may be included if active supervision is being exercised and if definite service is rendered during the visits.

9. *Admissions to sanatoria* include all residents of the area who have tuberculosis and are admitted to any hospital or any sanatorium either in the area or outside the area, irrespective of the agency or person responsible for admission of the patients. Admissions of nonresident patients to sanatoria or hospitals within the area are not counted in local health department work.

D. Maternity Service.

1. *Cases admitted to antepartum medical service* include only those given services by the health department where a physician is in attendance. Partial services, such as urinalysis or blood-pressure reading, by nonmedical attendants are not counted under this item.

6. *Office nursing visits by antepartum cases* apply to the visits of antepartum cases to the health department nurses, in which individual advisory services are rendered.

7. *Cases given nursing service at delivery* refer to obstetrical deliveries at which a nurse of the health department acted as an assistant to the attendant.

10. *Cases admitted to postpartum nursing service* should include those previously under antepartum care by health department nurses and those admitted for postpartum care only.

13. *Midwives under planned instruction* are those lay women who regularly engage in obstetrical practice and who have registered for organized courses of instruction. They are not to be included unless they are in regular attendance at courses conducted by the health department.

14. *Midwife meetings* are less formal in character than midwife classes. A staff member of the health department or some other person approved by the health officer must preside if this item is to be tabulated.

16. *Visits for midwife supervision* are visits made by or to members of the health department for the purpose of supervision of the practice of individual midwives.

20. *Enrollment in maternity classes* comprises the number of women receiving formal instruction in maternity hygiene and motherhood through courses organized under health department auspices.

E. Infant and Preschool Hygiene.

For purposes of classifying service to children—

An "infant" is a child under 1 year of age.

A "preschool child" is a child between 1 and 6 years of age who is not attending grade school. A child under 6 years of age in a nursery school or kindergarten is counted as a preschool child.

A child under continuous health supervision but passing from one age group to another during a report year is counted once as an infant and once as a preschool child.

Service to be recorded under this section is the usual prophylactic and health promotion service connoted by the term "hygiene." Care of sick children and reparative dentistry are to be included in "Morbidity service" (H). Measures for the control of communicable disease, tuberculosis, or venereal disease should be posted in the sections devoted to these parts of the program.

1, 8. *Infants admitted to medical service* and *preschool children admitted to medical service* include only those receiving services through facilities of the health department where physicians are in attendance.

2, 9. *Infants admitted to nursing service* and *preschool children admitted to nursing service* include all infants and preschool children seen by nurses of the health department in the interest of health supervision.

6, 13. *Office nursing visits* are those of infants and preschool children to health department nurses, in which individual advisory services are rendered.

15. *Prophylaxis by dentists or dental hygienists* includes services of the health department, such as the removal of calcareous deposits, cleaning of teeth, and the instruction of persons in care of the mouth.

19. *Enrollment in infant and preschool classes* comprises the number of adults receiving formal instruction in infant and preschool hygiene through courses organized under health department auspices.

F. School Hygiene.

For purposes of classifying service, a child is regarded as a "school child"—

If 6 years of age and under 15, regardless of whether he is attending school;

If under 6 years but attending grade school;

If 15 years or over and attending school.

1. *Inspections by physicians or nurses* are those observations by health department physicians or nurses for the detection of communicable disease, or of body parasites, or to check on correction of physical defects found by previous examinations.

2. *Examinations by physicians* are the more formal types of examinations given by the health department at stated periods during school life to determine physical status.

3. *Examinations by physicians with parents present* are those which are made in the presence of parents (father, mother, or guardian), thus affording an opportunity for the physicians to discuss the findings with the parents.

G. Adult Hygiene.

1–5. *Physical examinations* include the number of examinations made by health department physicians of (1) persons engaged in occupations where freedom from certain diseases is required by the health authorities and (2) supposedly well adults who wish to have an appraisal of their physical condition. Laboratory tests or interim inspections for specific communicable diseases do not in themselves constitute a physical examination. The number of examinations rather than the number of individuals forms the basis of enumeration.

H. Morbidity Service.

1, 2. *Admissions to medical service* and *admissions to nursing service* include sick persons who are provided with medical and/or nursing care on an ambulatory or domiciliary basis through facilities of the health department and who are not listed elsewhere in the tabulation. Care of inmates in penal and custodial institutions, exclusive of what may be regarded as hospital work, should be recorded under these items. The illness rather than the individual forms the basis of enumeration.

3, 4. *Clinic visits* and *field medical visits* are visits in the interest of medical care which are made by or to clinic and field physicians of the health department.

5, 6. *Field nursing visits* and *office nursing visits* are visits in the interest of morbidity nursing care which are made by or to field and clinic nurses employed by the health department.

7. *Admissions to hospitals* include those patients admitted for medical or surgical or obstetrical care to hospital facilities of the health department. Only admissions to the hospital sections of penal and custodial institutions are to be posted for such institutions. The illness rather than the individual forms the basis of enumeration.

8. *Patient-days of hospital service* are the sum of the days that all patients receiving medical or surgical or obstetrical care were in hospital facilities of the health department.

9. *Individuals admitted to dental service* are persons admitted to facilities of the health department for reparative dentistry.

10, 11. *Refractions* and *tonsil and adenoid operations* are terms used to describe corrective work performed in facilities of the health department for the implied physical defects of children. Other corrections are to be recorded under "Other service" (H 12).

I. Crippled Children Service.

Unless otherwise specified by State law, a "child" is defined, for the purposes of tabulation, as any person under 21 years of age having orthopedic or other types of deformities commonly connoted by the term "crippled."

1. *Individuals reported* include all children having orthopedic or other types of deformities who come to the attention of the health department.

2. *Individuals examined at diagnostic clinics* are crippled children examined by orthopedic or other specialists at health department clinics or elsewhere if by arrangement of the health department.

3. *Individuals treated* are those children who obtained care in connection with a crippling condition. Such care may be posted if it is rendered by the health department or if the department definitely makes the arrangements.

7. *Other service* is intended for the separate listing of visits or other services by physiotherapists, social workers, and nutritionists if rendered by the health department.

J. General Sanitation.

1, 2, 3. *Approved individual water supplies installed, new privies installed,* and *new septic tanks installed* include those sanitary improvements made by or induced by the health department. However, it must be understood that these items relate to new construction of individual water supplies and excreta disposal facilities which are not connected with the public system.

4–11. *Field visits* are synonomous with "inspections" as commonly used and include all visits by the health department personnel in the interest of sanitation. As was pointed out in "Enumeration of procedures," the count is usually based on the premises. However, in the case of a premises such as a hotel with several utilities or an amusement park having numerous concessions, a separate entry is made on the record of each utility or concession seen for a definite purpose and each contact is counted as a separate visit.

12. *Buildings mosquito proofed* refer to buildings where people congregate or reside which the health department has been instrumental in making mosquito proof by screening with 16-mesh wire and by stoppage of cracks and holes through which mosquitoes might enter.

14. *Anopheles breeding places eliminated* refer to depressions where water normally collected and which the health department has succeeded in having filled or drained for the purpose of permanently preventing the breeding of mosquitoes.

15. *Anopheles breeding places controlled* refer to natural and artificial collections of water which through the efforts of the health department have been treated with approved larvicides for the purpose of preventing breeding of mosquitoes.

K. Protection of Food and Milk.

1. *Food-handling establishments registered for supervision* comprise the number of places at which food or beverages are produced, processed, or dispensed, and over which the health department regularly exercises sanitary control. Establishments can be registered but once each report year and then only if a complete survey of each premises is made and the findings are recorded.

3. *Dairy farms registered for supervision* include only farms producing milk under provision of milk regulations or ordinances and receiving at least one complete inspection by the health department during the report year.

5. *Milk plants registered for supervision* are to be considered in the same manner as "Food-handling establishments." The term "milk plants" applies to pasteurizing plants, milk depots, cheese factories, creameries, ice cream factories, and other similar places.

7. *Cows tuberculin tested* are cows tested by veterinarians of the health department, and dairy cows tested by other veterinarians when testing is required by local milk ordinances.

8. *Animals slaughtered under inspection* refer to animals slaughtered for food under competent antemortem and postmortem inspections by the health department.

9. *Carcasses condemned in whole or in part* refer to carcasses condemned by the health department and disposed of in an approved manner.

L. Laboratory Service.

1–21. *Specimens examined* include specimens examined by the health department laboratory and specimens examined by other laboratories for the health department.

DEFINITIONS AND INSTRUCTIONS FOR TABULATION OF REPORTABLE DISEASES [1]

Source of list.—The diseases affecting man which appear on the tabulation form are selected from those in the International List of Causes of Death, fourth revision, 1929. The figures in parentheses after the diseases are the International List numbers.

Use of columns.—The columns following the list of diseases are to be used according to the general directions appearing in Definitions and Instructions for Tabulation of Health Department Services.

Method of enumeration.—Only reportable diseases coming to the attention of the health department are to be included. A case reported by a school authority, householder, nurse, or other nonmedical person is to be regarded as a suspect until the diagnosis has been established and the case is reported by an attending physician or a medical officer of the health department. A report by a veterinarian is accepted for a disease in an animal. A positive laboratory finding alone is not to be accepted in lieu of a clinical diagnosis by a physician, or by a veterinarian if the condition occurs in animals. If any disease listed on the form is not reportable in the State, the omission should be accounted for by placing in the first column opposite the disease the letters N. R. (not reportable).

[1] Definitions and instructions apply to Tabulation of Reportable Diseases, approved in 1936 by State and Territorial Health Officers, the United States Public Health Service, and the United States Children's Bureau.

State .... County or district ....
Population of health jurisdiction .... Period ...... Year .

A. COMMUNICABLE DISEASE CONTROL.					
1. Admissions to service					
2. Consultations with physicians					
Field visits					
3. Diphtheria					
4. Typhoid fever and paratyphoid fever					
5. Scarlet fever					
6. Smallpox					
7. Measles					
8. Whooping cough					
9. Other (specify)					
....					
Admissions to hospitals					
10. Diphtheria					
11. Typhoid fever and paratyphoid fever					
12. Scarlet fever					
13. Smallpox					
14. Other (specify)					
....					
Immunizations (persons immunized)					
15. Smallpox					
16. Diphtheria, under 1 year					
17. Diphtheria, 1 through 4 years					
18. Diphtheria, 5 years and over					
19. Typhoid fever					
20. Other (specify)					
....					
21. Public lectures and talks					
22. Attendance					
B. VENEREAL DISEASE CONTROL.					
1. Admissions to medical service					
2. Cases transferred to private physicians					
3. Clinic visits					
4. Field visits					
5. Other service (specify)					
....					
6. Public lectures and talks					
7. Attendance					

Form no..........
Approved 1936.

Tabulation of Health Department Services.

Approved by: State and Territorial Health Officers, United States Public Health Service, United States Children's Bureau.

State .... County or district .... Period ..... Year .

C. TUBERCULOSIS CONTROL.					
1. Individuals admitted to medical service					
2. Individuals admitted to nursing service					
3. Physical examinations in clinics					
4. X-ray examinations					
5. Clinic visits					
6. Visits to private physicians					
7. Field nursing visits					
8. Office nursing visits					
9. Admissions to sanatoria					
10. Other service (specify)					
11. Public lectures and talks					
12. Attendance					
D. MATERNITY SERVICE.					
1. Cases admitted to antepartum medical service					
2. Cases admitted to antepartum nursing service					
3. Visits by antepartum cases to medical conferences					
4. Visits by antepartum cases to private physicians					
5. Field nursing visits to antepartum cases					
6. Office nursing visits by antepartum cases					
7. Cases given nursing service at delivery					
8. Cases given postpartum medical examination					
9. Cases given postpartum examination by private physicians					
10. Cases admitted to postpartum nursing service					
11. Nursing visits to postpartum cases					
12. Other service (specify)					
13. Midwives under planned instruction					
14. Midwife meetings					
15. Attendance at meetings					
16. Visits for midwife supervision					
17. Other service (specify)					
18. Public lectures and talks					
19. Attendance					
20. Enrollment in maternity classes					
21. Attendance					
E. INFANT AND PRESCHOOL HYGIENE.					
Infants					
1. Individuals admitted to medical service					
2. Individuals admitted to nursing service					
3. Visits to medical conferences					
4. Visits to private physicians					
5. Field nursing visits					
6. Office nursing visits					
7. Other service (specify)					
Preschool					
8. Individuals admitted to medical service					
9. Individuals admitted to nursing service					
10. Visits to medical conferences					
11. Visits to private physicians					
12. Field nursing visits					
13. Office nursing visits					
14. Inspections by dentists or dental hygienists					
15. Prophylaxis by dentists or dental hygienists					
16. Other service (specify)					
17. Public lectures and talks					
18. Attendance					
19. Enrollment in infant and preschool classes					
20. Attendance					

State .... County or district .... Period ... Year....

F. SCHOOL HYGIENE.					
1. Inspections by physicians or nurses					
2. Examinations by physicians					
3. Examinations by physicians with parents present					
4. Individuals admitted to nursing service					
5. Field nursing visits					
6. Office nursing visits					
7. Inspections by dentists or dental hygienists					
8. Prophylaxis by dentists or dental hygienists					
9. Other service (specify)					
....					
10. Public lectures and talks					
11. Attendance					
12. Classroom health talks					
13. Attendance					
G. ADULT HYGIENE.					
Physical examinations					
1. Milk handlers					
2. Other food handlers					
3. Midwives					
4. Teachers					
5. Other (specify)					
....					
H. MORBIDITY SERVICE.					
1. Admissions to medical service					
2. Admissions to nursing service					
3. Clinic visits					
4. Field medical visits					
5. Field nursing visits					
6. Office nursing visits					
7. Admissions to hospitals					
8. Patient-days of hospital service					
9. Individuals admitted to dental service					
10. Refractions					
11. Tonsil and adenoid operations					
12. Other service (specify)					
....					
I. CRIPPLED CHILDREN SERVICE.					
1. Individuals reported					
2. Individuals examined at diagnostic clinics					
3. Individuals treated					
4. Individuals admitted to nursing service					
5. Visits to diagnostic clinics					
6. Nursing visits					
7. Other service (specify)					
....					
8. Public lectures and talks					
9. Attendance					

State ______________ County or district __________ Period ____ Year ____

J. GENERAL SANITATION.					
1. Approved individual water supplies installed					
2. New privies installed					
3. New septic tanks installed					
Field visits					
4. Private premises					
5. Camp sites					
6. Swimming pools					
7. Barber shops and beauty parlors					
8. Schools					
9. Public water supplies					
10. Sewerage plants					
11. Other (specify)					
12. Buildings mosquito proofed					
13. Minor drainage—linear feet completed					
14. Anopheles breeding places eliminated					
15. Anopheles breeding places controlled					
16. Other service (specify)					
17. Public lectures and talks					
18. Attendance					
K. PROTECTION OF FOOD AND MILK.					
1. Food-handling establishments registered for supervision					
2. Field visits to food-handling establishments					
3. Dairy farms registered for supervision					
4. Field visits to dairy farms					
5. Milk plants registered for supervision					
6. Field visits to milk plants					
7. Cows tuberculin tested					
8. Animals slaughtered under inspection					
9. Carcasses condemned in whole or in part					
10. Other service (specify)					
11. Public lectures and talks					
12. Attendance					
L. LABORATORY.					
Specimens examined					
1. Water—bacteriological					
2. Water—chemical					
3. Milk or milk products					
4. Other food					
5. Typhoid: Blood cultures					
6. Typhoid: Widal					
7. Typhoid: Stool cultures					
8. Typhoid: Urine cultures					
9. Diphtheria cultures					
10. Syphilis					
11. Undulant fever (human)					
12. Bangs disease (animal)					
13. Typhus fever					
14. Tularemia					
15. Malaria					
16. Gonorrhea					
17. Tuberculosis					
18. Feces for parasites					
19. Urinalysis					
20. Rabies					
21. Other service (specify)					

______________________________,
Health Officer.

______________________________,

______________________________,
Address.

______________________________,
Date.

State .... County or district ....
Population of health jurisdiction .... Period .... Year .

REPORTABLE DISEASES					
Anthrax (20)					
Chickenpox (44a)					
Diphtheria (10)					
Dysentery (13)					
Gonorrhea (35)					
Hookworm (40)					
Influenza (11)					
Malaria (38)					
Measles (7)					
Meningococcus meningitis (18)					
Ophthalmia neonatorum (35)					
Pellagra (62)					
Pneumonia (107-109)					
Poliomyelitis (16)					
Puerperal septicemia (145)					
Rabies in man (21)					
Rabies in animal					
Scarlet fever (8)					
Smallpox (6)					
Streptococcic sore throat (115a)					
Syphilis (34)					
Trachoma (88)					
Tuberculosis (23-32)					
Tularemia (44c)					
Typhoid fever (1)					
Typhus fever (3)					
Undulant fever (5)					
Whooping cough (9)					

Form no..........
Approved 1936.

Tabulation of Reportable Diseases.

Approved by State and Territorial Health Officers, United States Public Health Service, United States Children's Bureau.

..............................,
Health Officer.

..............................,
..............................,
Address.

..............................,
Date.

DEATHS DURING WEEK ENDED AUGUST 15, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 15, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,277	6,955
Deaths per 1,000 population, annual basis	10.2	9.7
Deaths under 1 year of age	491	514
Deaths under 1 year of age per 1,000 estimated live births	45	47
Deaths per 1,000 population, annual basis, first 33 weeks of year	12.6	11.7
Data from industrial insurance companies:		
Policies in force	68,206,196	67,585,751
Number of death claims	11,456	11,014
Death claims per 1,000 policies in force, annual rate	8.8	8.5
Death claims per 1,000 policies, first 33 weeks of year, annual rate	10.3	10.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Aug. 22, 1936, and Aug. 24, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 22, 1936, and Aug. 24, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935
New England States:								
Maine		1	1		10	38	0	0
New Hampshire							0	0
Vermont					7	12	0	0
Massachusetts	2	6			46	21	1	0
Rhode Island	1	2			3	2	0	0
Connecticut		2			10	16	0	1
Middle Atlantic States:								
New York	18	10		[1] 1	96	146	3	5
New Jersey	10	1	6	3	44	32	1	2
Pennsylvania	18	29			39	30	5	0
East North Central States:								
Ohio	9	11	6	1	7	17	3	1
Indiana	10	11	7	47	4	2	2	4
Illinois	21	15	4	3	11	32	3	7
Michigan	6	8	1		8	31	0	0
Wisconsin	1	2	7	20	20	56	0	1
West North Central States:								
Minnesota	1	1		1		2	2	0
Iowa	2	5		2		3	3	2
Missouri	2	18	8	28	2	6	1	3
North Dakota		2		18		8	0	0
South Dakota		3					0	1
Nebraska	3	11			3	1	0	0
Kansas	5	3		1	5	4	2	1
South Atlantic States:								
Delaware					1	4	0	3
Maryland [2,3]	5	6			11	1	3	4
District of Columbia	2	9		1	3	1	1	4
Virginia [4]	9	28			19	12	1	7
West Virginia	10	20		10	5	10	0	1
North Carolina	18	21			4		3	1
South Carolina	5	9	30	45	2	1	0	0
Georgia [3]	22	18					2	0
Florida [3]	3	3		1	11	4	2	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 22, 1936, and Aug. 24, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935
East South Central States:								
Kentucky	7	22			4	31	1	0
Tennessee [3]	24	11	8	12	1	6	1	5
Alabama [3]	15	33	4	5			0	1
Mississippi [2]	16	19					0	0
West South Central States:								
Arkansas	4	11	1	5			0	0
Louisiana [3]	9	12	22	19	2	11	3	1
Oklahoma [3 5]	10	9	6	5		4	0	1
Texas [3]	25	39	28	12	26		1	0
Mountain States:								
Montana						4	0	0
Idaho			1	1	3	2	0	0
Wyoming	1					18	0	0
Colorado	2	9			2	6	4	0
New Mexico	6	2			6		0	1
Arizona	2	3	7	4	5	2	0	0
Utah [2]	2	1			1	1	0	0
Pacific States:								
Washington	2				13	17	0	0
Oregon	1		3	3	5	43	1	0
California	19	23	12	10	49	87	2	4
Total	328	449	171	258	498	733	51	56
First 34 weeks of year	15,440	18,569	141,908	104,369	270,548	696,212	6,009	4,221

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935
New England States:								
Maine	0	8	5	1	0	0	2	6
New Hampshire		4			0	0	1	0
Vermont	0	4		1	0	0	0	0
Massachusetts	2	112	34	49	0	0	3	3
Rhode Island	0	30	4	2	0	0	0	1
Connecticut	1	40	3	6	0	0	1	2
Middle Atlantic States:								
New York	11	201	86	67	0	0	22	37
New Jersey	1	26	18	23	0	0	10	10
Pennsylvania	1	11	84	88	0	0	37	24
East North Central States:								
Ohio	8	2	48	51	0	0	13	27
Indiana	1	2	20	22	1	0	8	11
Illinois	15	9	66	83	0	0	28	51
Michigan	3	87	46	23	2	0	6	14
Wisconsin	0	10	60	42	0	0	2	2
West North Central States:								
Minnesota	1	3	12	26	9	0	3	21
Iowa	0	1	20	16	2	0	9	4
Missouri	1	1	10	21	0	0	22	23
North Dakota	0	2	14	9	1	0	1	1
South Dakota	2	1	2	3	3	0	1	3
Nebraska	0	1	6	1	0	2	4	0
Kansas	0	0	26	11	0	0	6	16
South Atlantic States:								
Delaware	0	0		1	0	0	2	4
Maryland [2 3]	0	6	13	18	0	0	13	23
District of Columbia	0	7	2	5	0	0	3	4
Virginia [4]	4	39	11	16	0	0	20	41
West Virginia	0	4	19	26	0	0	10	28
North Carolina	0	11	16	15	0	1	21	21
South Carolina	0	3	1	2	0	0	16	20
Georgia [3]	1	0	10	5	0	0	26	30
Florida [3]	0	1	2	2	0	0	1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 22, 1936, and Aug. 24, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935	Week ended Aug. 22, 1936	Week ended Aug. 24, 1935
East South Central States:								
Kentucky	5	36	4	20	0	0	56	81
Tennessee [3]	24	6	14	15	0	0	53	47
Alabama [3]	21	1	15	3	1	0	29	22
Mississippi [2]	10	1	5	8	0	0	7	4
West South Central States:								
Arkansas	1	1	6	8	0	3	14	0
Louisiana [3]	2	6	1	2	0	0	29	22
Oklahoma [3, 5]	1	0	1	4	0	0	11	35
Texas [3]	1	4	11	31	0	16	50	58
Mountain States:								
Montana	1	0	9	3	24	0	3	3
Idaho	1	0	5	6	0	0	1	1
Wyoming	0	0	6	2	4	1	0	0
Colorado	0	0	4	15	1	0	5	3
New Mexico	0	0	2	14	0	0	2	11
Arizona	0	0	1	3	0	0	6	3
Utah [2]	0	1	5	16	1	0	1	0
Pacific States:								
Washington	2	2	12	8	1	4	2	12
Oregon	1	0	8	17	1	1	3	8
California	11	24	57	67	0	2	8	11
Total	133	807	804	877	51	30	571	749
First 34 weeks of year	1,700	4,329	184,756	181,256	6,296	5,341	7,467	9,997

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Aug. 22, 1936, 67 cases, as follows: Maryland, 1; Georgia, 40; Florida, 1; Tennessee, 1; Alabama, 12; Louisiana, 1; Oklahoma, 1; Texas, 10.
[4] Rocky Mountain spotted fever, week ended Aug. 22, 1936: Virginia, 5 cases.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1936										
Alabama	6	34	7	952	19	41	194	40	0	73
Georgia	7	36	33	1,597	10	74	14	26	0	179
Idaho	1	1	3	-------	49	-------	5	26	12	9
Illinois	27	109	40	40	67	-------	28	607	56	46
Kansas	2	22	3	2	22	1	4	188	5	29
Louisiana	5	37	58	237	27	16	3	16	0	123
Maryland	14	21	6	2	426	1	2	71	0	28
Minnesota	2	19	1	4	149	-------	3	199	14	6
Mississippi	1	15	337	805	274	488	23	19	0	94
Nevada	-------	-------	4	-------	2	-------	0	10	0	0
New Mexico	2	7	4	2	54	4	1	34	0	34
North Dakota	1	-------	1	-------	10	-------	4	24	13	3
Oklahoma [1]	2	23	25	198	3	24	0	28	0	89
Rhode Island	3	7	-------	-------	46	-------	0	36	0	2
South Carolina	-------	69	115	1,114	23	123	1	6	0	35
Tennessee	9	19	107	244	69	46	60	36	0	121
Texas	4	71	183	3,933	251	71	1	66	-------	161
West Virginia	13	12	12	-------	32	1	3	65	1	32

[1] Exclusive of Oklahoma City and Tulsa.

Summary of monthly reports from states—Continued

July 1936

Disease and state	Cases
Chicken pox:	
Alabama	12
Georgia	21
Idaho	11
Illinois	471
Kansas	13
Louisiana	1
Maryland	72
Minnesota	75
Mississippi	137
Nevada	3
New Mexico	11
North Dakota	14
Oklahoma [1]	5
Rhode Island	15
South Carolina	30
Tennessee	4
Texas	33
West Virginia	37
Conjunctivitis:	
Georgia	6
Maryland	1
New Mexico	1
Dengue:	
Louisiana	1
Mississippi	12
South Carolina	4
Texas	1
Diarrhea:	
Maryland	25
South Carolina	710
Dysentery:	
Georgia (amoebic)	15
Georgia (bacillary)	116
Illinois (amoebic)	5
Illinois (amoebic carriers)	31
Illinois (bacillary)	4
Kansas (amoebic)	1
Kansas (bacillary)	1
Louisiana (amoebic)	7
Maryland	8
Minnesota (amoebic)	3
Minnesota (bacillary)	2
Mississippi (amoebic)	125
Mississippi (bacillary)	1, 580
New Mexico (amoebic)	1
New Mexico (bacillary)	18
Oklahoma [1]	71
Tennessee (amoebic)	3
Tennessee (bacillary)	117
Texas (amoebic)	1
Texas (bacillary)	30
Epidemic encephalitis:	
Alabama	4
Georgia	2
Illinois	4
Kansas	4
Louisiana	2
Maryland	1
Minnesota	1
North Dakota	1
Texas	3
Food poisoning:	
Maryland	7
German measles:	
Alabama	4
Illinois	32
Kansas	8
Maryland	56
New Mexico	4
Rhode Island	100
Tennessee	1
Glanders:	
Louisiana	1

Disease and state	Cases
Hookworm disease:	
Georgia	204
Louisiana	10
Mississippi	302
South Carolina	47
Impetigo contagiosa:	
Kansas	1
Maryland	24
Tennessee	2
Lead poisoning:	
Illinois	4
Maryland	2
Leprosy:	
Louisiana	1
South Carolina	1
Mumps:	
Alabama	49
Georgia	127
Idaho	15
Illinois	220
Kansas	54
Louisiana	6
Maryland	343
Mississippi	314
Nevada	2
New Mexico	20
North Dakota	22
Oklahoma [1]	11
Rhode Island	21
South Carolina	46
Tennessee	41
Texas	238
West Virginia	26
Ophthalmia neonatorum:	
Alabama	3
Illinois	6
Maryland	1
Mississippi	17
Oklahoma [1]	1
South Carolina	5
Tennessee	5
Paratyphoid fever:	
Georgia	5
Illinois	4
Louisiana	4
South Carolina	8
Texas	6
Puerperal septicemia:	
Mississippi	16
Tennessee	1
Rabies in animals:	
Alabama	68
Illinois	37
Louisiana	27
Mississippi	17
South Carolina	28
Rabies in man:	
Illinois	1
Relapsing fever:	
Kansas	1
Rocky Mountain spotted fever:	
Idaho	6
Illinois	2
Maryland	14
Minnesota (delayed report)	1
Tennessee	6
West Virginia	1
Scabies:	
Oklahoma [1]	4
Tennessee	2
Septic sore throat:	
Georgia	17
Idaho	2
Illinois	8
Kansas	5

Disease and state	Cases
Septic sore throat—Con.	
Louisiana	7
Maryland	5
Minnesota	9
New Mexico	1
Oklahoma [1]	28
Rhode Island	3
Tennessee	1
Tetanus:	
Alabama	7
Georgia	1
Illinois	7
Kansas	1
Louisiana	6
Maryland	8
Tennessee	3
Trachoma:	
Illinois	161
Mississippi	2
Oklahoma [1]	1
Tennessee	44
Tularaemia:	
Alabama	1
Georgia	3
Illinois	8
Kansas	1
Louisiana	8
Minnesota	12
Nevada	6
Tennessee	2
Texas	4
Typhus fever:	
Alabama	46
Georgia	116
Louisiana	1
Maryland	2
South Carolina	2
Texas	31
Undulant fever:	
Alabama	6
Georgia	13
Illinois	7
Kansas	5
Louisiana	3
Maryland	6
Minnesota	9
Mississippi	1
New Mexico	3
Oklahoma [1]	9
Tennessee	5
Texas	9
Vincent's infection:	
Idaho	1
Illinois	24
Kansas	3
Maryland	10
North Dakota	4
Oklahoma [1]	6
Tennessee	4
Whooping cough:	
Alabama	46
Georgia	46
Idaho	24
Illinois	945
Kansas	67
Louisiana	117
Maryland	450
Minnesota	133
Mississippi	293
Nevada	8
New Mexico	69
North Dakota	7
Oklahoma [1]	16
Rhode Island	34
South Carolina	38
Tennessee	51
Texas	13
West Virginia	42

[1] Exclusive of Oklahoma City and Tulsa.

PLAGUE INFECTION IN CALIFORNIA AND UTAH

Plague infection has been reported proved by animal inoculation in a collection of 315 fleas taken from 11 ground squirrels, *Citellus grammurus*, shot on July 28 in Clear Creek Canyon about 15 miles northeast of Cove Fort, Sevier County, Utah.

The State Director of Public Health of California has reported plague infection proved by animal inoculation in 5 squirrels from a ranch 33 miles north and 13 miles west of Alturus, Modoc County, Calif., making a total of 10 squirrels proved positive for plague from that focus.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 15, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	0	0	0	1	0	4	18
New Hampshire:											
Concord	0	------	0	0	2	0	0	1	0	0	8
Manchester	0	------	0	0	0	1	0	0	0	0	6
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	2	6
Rutland	0	------	0	1	0	0	0	0	0	2	3
Massachusetts:											
Boston	2	------	0	11	9	12	0	8	1	83	181
Fall River	0	------	0	0	1	3	0	0	0	0	29
Springfield	0	------	0	2	0	0	0	0	0	0	27
Worcester	0	------	0	10	1	2	0	1	0	16	40
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	------
Providence	0	------	0	0	5	0	0	3	1	20	49
Connecticut:											
Bridgeport	0	------	0	3	2	0	0	1	0	6	25
Hartford	0	------	0	1	2	2	0	0	1	1	39
New Haven	0	------	0	0	1	0	0	0	1	12	33
New York:											
Buffalo	0	------	0	6	1	6	0	7	0	10	127
New York	13	------	2	51	46	25	0	77	18	115	1,131
Rochester	0	------	0	0	3	0	0	0	2	1	46
Syracuse	0	------	0	0	3	2	0	0	0	7	39
New Jersey:											
Camden	0	------	0	1	0	2	0	0	0	4	24
Newark	0	------	0	2	3	2	0	8	0	21	84
Trenton	0	------	0	0	3	2	0	1	0	0	29
Pennsylvania:											
Philadelphia	3	1	1	8	11	9	0	25	3	93	376
Pittsburgh	0	------	0	1	9	6	0	6	0	20	145
Reading	0	------	0	0	0	0	0	0	6	6	26
Ohio:											
Cincinnati	4	------	0	1	3	1	0	8	0	2	106
Cleveland	0	3	0	10	7	19	0	9	2	74	145
Columbus	1	------	0	0	2	2	0	4	0	6	76
Toledo	0	------	0	2	3	0	0	3	3	36	61
Indiana:											
Anderson	0	------	0	0	1	1	0	0	0	5	12
Fort Wayne	0	------	0	0	2	2	0	0	0	0	22
Indianapolis	0	------	0	0	2	3	0	3	1	6	91
Muncie	0	------	0	0	1	0	0	0	0	0	10
South Bend	0	------	0	0	0	0	0	0	0	1	13
Terre Haute	0	------	0	0	0	0	0	0	0	0	------

City reports for week ended Aug. 15, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Illinois:											
Alton	0	------	0	0	0	1	0	0	0	3	4
Chicago	7	------	0	5	16	45	0	43	6	93	598
Elgin	0	------	0	0	0	0	0	0	0	1	12
Moline	0	------	0	0	1	0	0	1	0	0	11
Springfield	0	------	0	0	0	1	0	0	1	1	24
Michigan:											
Detroit	0	1	0	8	7	23	0	25	0	105	235
Flint	1	------	0	0	1	5	0	3	0	7	20
Grand Rapids	0	------	0	0	0	2	0	0	0	17	23
Wisconsin:											
Kenosha	0	------	0	0	0	2	0	0	0	0	5
Madison	0	------	0	0	0	1	0	0	0	18	4
Milwaukee	0	------	0	1	6	14	0	5	0	47	94
Racine	0	------	0	1	0	2	0	0	1	5	15
Superior	0	------	0	0	0	0	0	0	0	0	6
Minnesota:											
Duluth	1	------	1	0	0	3	0	1	1	3	17
Minneapolis	0	------	0	1	3	1	0	0	0	8	82
St. Paul	0	------	0	2	3	2	0	2	0	16	54
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	1	0	------
Davenport	0	------	------	0	------	2	0	------	0	0	------
Des Moines	2	------	------	0	------	0	0	------	0	1	------
Sioux City	0	------	------	0	------	3	1	------	0	0	------
Waterloo	0	------	------	0	------	0	0	------	0	2	------
Missouri:											
Kansas City	0	------	0	0	6	6	0	8	0	1	115
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	4	------	0	1	4	8	0	8	1	11	188
North Dakota:											
Fargo	0	------	0	0	0	3	0	0	0	0	7
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	0	0	0	0	0	3
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	1	0	------
Nebraska:											
Omaha	0	------	0	1	1	0	0	3	0	0	41
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	6
Topeka	0	1	1	0	1	0	0	0	0	0	16
Wichita	0	------	0	0	2	0	0	0	1	2	33
Delaware:											
Wilmington	0	------	0	0	0	1	0	2	0	9	27
Maryland:											
Baltimore	1	2	0	16	6	5	0	7	0	84	172
Cumberland	0	------	0	0	0	0	0	0	2	0	12
Frederick	0	------	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	4	------	0	4	4	2	0	8	1	41	140
Virginia:											
Lynchburg	0	------	0	0	0	0	0	0	0	0	8
Norfolk	0	------	0	0	3	2	0	3	0	0	28
Richmond	0	------	0	0	4	2	0	5	1	1	56
Roanoke	0	------	0	0	0	0	0	1	3	0	15
West Virginia:											
Charleston	0	------	0	0	0	0	0	1	1	0	19
Huntington	3	------	------	0	0	1	0	0	0	0	------
Wheeling	0	------	0	1	2	0	0	0	0	2	19
North Carolina:											
Gastonia	0	------	0	0	0	0	0	0	0	0	------
Raleigh	0	------	0	0	1	0	0	2	0	0	16
Wilmington	0	------	0	0	2	1	0	0	0	2	14
Winston-Salem	0	------	0	0	0	0	0	0	1	0	10
South Carolina:											
Charleston	0	2	0	0	2	0	0	0	1	0	22
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	0	0	0	0	0	0	5
Greenville	1	------	0	1	0	1	0	1	0	0	11
Georgia:											
Atlanta	0	1	0	0	8	4	0	0	0	1	69
Brunswick	0	------	0	0	0	0	0	0	0	0	2
Savannah	2	2	0	0	0	0	0	1	1	1	20
Florida:											
Miami	0	------	0	1	0	0	0	2	0	4	26
Tampa	1	------	0	2	1	1	0	0	0	0	20

City reports for week ended Aug. 15, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Kentucky:											
Ashland	0			0		2	0		0	0	0
Covington	0		0	0	2	0	0	0	0	0	12
Lexington	0		0	0	1	0	0	3	0	0	25
Louisville	1		0	0	3	4	0	2	2	13	80
Tennessee:											
Knoxville	2		2	0	2	0	0	2	1	0	33
Memphis	1		0	0	6	0	0	4	5	9	93
Nashville	2		0	0	6	0	0	0	0	0	65
Alabama:											
Birmingham	0		0	0	3	1	0	3	2	0	53
Mobile	0		0	0	2	0	0	2	0	0	29
Montgomery	0			0		0	0		0	0	
Arkansas:											
Fort Smith											
Little Rock	0		0	0	0	2	0	3	1	0	3
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	4
New Orleans	6	3	0	3	6	0	0	14	8	0	151
Shreveport	0		0	0	1	0	0	2	1	0	41
Oklahoma:											
Oklahoma City	1	4	0	0	5	0	0	0	2	2	61
Tulsa	0			0		0	0		0	4	
Texas:											
Dallas	2		0	2	9	1	0	2	0	0	107
Fort Worth	4		0	0	3	0	0	2	0	0	53
Galveston	1		0	0	1	0	0	0	0	0	21
Houston	7		0	1	3	1	0	9	2	1	99
San Antonio	0		0	1	1	0	0	7	0	0	82
Montana:											
Billings	0		0	0	0	0	0	0	0	1	3
Great Falls	0		0	0	0	0	0	0	0	5	8
Helena	0		0	0	0	2	0	0	0	0	5
Missoula	0		0	0	0	0	0	2	0	0	4
Idaho:											
Boise	0		0	0	1	0	0	0	0	0	8
Colorado:											
Colorado Springs	0		0	0	1	1	0	2	0	0	17
Denver	1		0	2	6	1	0	1	0	38	89
Pueblo	0		0	0	0	1	0	0	1	0	11
New Mexico:											
Albuquerque	0		0	0	0	0	0	4	1	0	17
Utah:											
Salt Lake City	0		0	7	0	3	0	1	0	8	31
Nevada:											
Reno											
Washington:											
Seattle											
Spokane	0		0	3	1	2	0	1	0	2	31
Tacoma	0		0	0	0	2	0	0	2	2	23
Oregon:											
Portland	0		0	0	3	0	0	3	0	18	72
Salem	0			0		0	0		1	0	
California:											
Los Angeles	10	7	0	9	15	8	0	20	1	41	323
Sacramento	2		0	1	1	9	0	1	0	22	37
San Francisco	1	1	1	2	3	11	0	14	0	11	164

City reports for week ended Aug. 15, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				District of Columbia:			
Boston	1	0	1	Washington	3	1	0
Worcester	1	0	0	Virginia:			
New York:				Lynchburg	0	0	1
Buffalo	1	0	1	Florida:			
New York	7	4	4	Miami	0	0	2
New Jersey:				Tennessee:			
Newark	1	0	0	Memphis	0	0	1
Pennsylvania:				Nashville	0	0	2
Philadelphia	1	0	0	Birmingham	0	0	3
Ohio:				Louisiana:			
Cincinnati	2	1	0	New Orleans	1	1	0
Columbus	1	0	0	Texas:			
Toledo	0	0	1	Dallas	0	0	1
Illinois:				Houston	1	0	0
Chicago	1	0	3	Colorado:			
Moline	0	0	1	Denver	1	0	1
Michigan:				Washington:			
Detroit	0	0	1	Spokane	0	0	2
Kansas:				Oregon:			
Topeka	0	0	1	Salem	0	0	1
Maryland:				California:			
Baltimore	3	1	0	Los Angeles	1	1	1

Dengue.—Cases: Grand Rapids, 1.

Epidemic encephalitis.—Cases: New York, 2; Philadelphia, 2; Grand Rapids, 1; Duluth, 1; Wichita, 2; Memphis, 1; Denver, 2; Albuquerque, 1; Portland, Oreg., 1.

Pellagra.—Cases: Hartford, 1; Winston-Salem, 1; Atlanta, 1; Savannah, 7; Louisville, 1; Dallas, 1.

Typhus fever.—Cases: New York, 2; Roanoke, 1; Atlanta, 3; Savannah, 4; Mobile, 1; Dallas, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended August 1, 1936.—During the 4 weeks ended August 1, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	3		Poliomyelitis	[1] 3	
Leprosy	2	1	Tuberculosis	13	3
Malaria	[1] 71	1	Typhoid fever	[1] 93	22

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended July 25, 1936.—During the 4 weeks ended July 25, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		3		3	1	4	11
Chicken pox		4		1	3		8
Diphtheria		1		1		2	4
Leprosy						6	6
Malaria	103	74	77	147	180	596	1,177
Measles		4			6	9	19
Poliomyelitis				3	4	1	8
Scarlet fever		1					1
Tuberculosis	21	7	13	28	9	37	115
Typhoid fever	19	110	65	71	18	51	334

ITALY

Communicable diseases—4 weeks ended June 21, 1936.—During the 4 weeks ended June 21, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	May 25-31		June 1-7		June 8-14		June 15-21	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	13	13	16	16	12	9	17	16
Cerebrospinal meningitis	18	16	23	22	19	17	16	15
Chicken pox	383	163	312	139	294	156	268	133
Diphtheria and croup	386	194	388	226	318	191	301	174
Dysentery	9	7	3	3	12	10	9	7
Hookworm disease	17	14	23	14	12	8	32	9
Lethargic encephalitis	1	1	3	2	1	1	1	1
Measles	2,211	352	2,174	354	1,978	358	1,971	360
Mumps	434	126	368	110	320	105	263	96
Paratyphoid fever	58	49	66	48	47	40	59	52
Poliomyelitis	36	25	57	40	44	29	76	53
Puerperal fever	28	28	25	22	34	32	23	21
Scarlet fever	278	128	274	126	235	114	278	122
Smallpox and varioloid	1	1					1	1
Typhoid fever	261	148	248	152	284	178	325	179
Undulant fever	96	64	110	71	117	68	117	88
Whooping cough	700	185	836	215	705	205	769	224

JAMAICA

Communicable diseases—4 weeks ended August 8, 1936.—During the 4 weeks ended August 8, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox		4	Puerperal fever		1
Diphtheria	1	1	Scarlet fever	1	
Dysentery	31	75	Tuberculosis	34	70
Erysipelas	1	1	Typhoid fever	26	87
Leprosy	1				

MALTESE ISLANDS

Vital statistics—1935.—The following table shows the births and deaths reported in the Maltese Islands during the year 1935, together with the number of deaths reported from certain notifiable diseases.

Estimated civil population	256,140	Deaths from—Continued	
Live births	8,701	Influenza	2
Births per 1,000 population	33.96	Measles	57
Deaths	6,018	Pneumonia	102
Deaths per 1,000 population	23.49	Puerperal sepsis	[illegible]
Deaths under 1 year per 1,000 live births	235.71	Scarlet fever	2
Deaths from:		Tuberculosis (respiratory system)	125
Cerebrospinal fever	1	Typhoid fever	32
Diphtheria	19	Undulant fever	80
Erysipelas	1	Whooping cough	14

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for August 28, 1936, pages 1214–1227. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued September 25, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Algeria—Oran Department—Mostaganem.—On August 18, 1936, 1 suspected case of plague was reported at Mostaganem, Oran Department, Algeria.

China—Manchuria—Kirin Province.—According to information dated August 20, 1936, 5 cases of plague were reported in Kirin Province, Manchuria, China.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—A rat found on August 13, 1936, in Paauhau Sector, Hamakua District, Hawaii Island, Hawaii Territory, has been proved plague-infected.

Peru.—During the month of July, 4 cases of plague with 3 deaths were reported in Peru.

United States.—A report of plague-infection in California and Utah appears on page 1257 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Ceylon—Colombo.—During the week ended August 8, 1936, 1 case of smallpox was reported in Colombo, Ceylon.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 SEPTEMBER 11, 1936 No. 37

THE OFFICIAL UNITED STATES AND INTERNATIONAL UNIT FOR STANDARDIZING GAS GANGRENE ANTITOXIN (HISTOLYTICUS)

By IDA A. BENGTSON, *Senior Bacteriologist*, and SARAH E. STEWART, *Assistant Bacteriologist, United States Public Health Service*

The work of standardizing gas gangrene antitoxin (*histolyticus*) has been conducted in a manner similar to that employed in the standardization of the other gas gangrene antitoxins (*perfringens, Vibrion septique* and *odematiens*). The undertaking has been a cooperative effort on the part of various laboratories. The initial planning of the experiments, and the preparation of the necessary materials for the international testing have been carried out by Drs. Walbum and Reymann in the laboratory of Dr. Th. Madsen, of the State Serum Institute of Copenhagen, Denmark, in accordance with the recommendation of the Permanent Commission on Biological Standardization at the meeting held in Copenhagen in November 1932.

The laboratories participating in the tests were the following:

- Istituto Bacteriologico, Argentina, South America.
- Pasteur Institute, Paris, France.
- Institut für Experimentelle Therapie "Emil von Behring", Marburg-am-Lahn, Germany.
- National Institute for Medical Research, Hampstead, London, England.
- Wellcome Physiological Research Laboratories, Beckenham, Kent, England.
- Lister Institute of Preventive Medicine, Elstree, Herts, England.
- State Institute "L. A. Tarassevitch", Moscow, U. S. S. R.
- National Institute of Health, Washington, D. C.

The standard preparations for carrying out the tests were received from Dr. Madsen in June 1935. These consisted of 1 ampul of *histolyticus* toxin (A/34), 1 bottle of glycerinated *histolyticus* antitoxin (the provisional standard), and one bottle of *histolyticus* antitoxin H of unstated potency.

At the time of the receipt of the reagents the National Institute of Health had on hand a dried *histolyticus* serum which it was intended to use as the American standard *histolyticus* antitoxin. As shown later in this paper, this antitoxin was standardized in terms of the provi-

sional international unit proposed by Walbum and Reymann through the *histolyticus* test toxin A/34 furnished by Dr. Madsen. The National Institute of Health test toxin was prepared later. (See the following paper by S. E. Stewart.)

The international provisional unit proposed by Walbum and Reymann was of the same dimensions as the unit introduced by Weinberg of the Pasteur Institute. This unit was used as the basis of their standardization studies and was designated as the P unit in the tests.

The glycerinated antitoxin received had been diluted so that 1 cc of the solution contained 20 provisional units. (The average weights of 8 ampuls containing the dried residue of 5 cc of serum in each ampul was 0.4966 gram. This amount represented 1,389 P units, and 1 P unit was therefore contained in 0.3575 milligram of the dried serum. By diluting the contents of 2 ampuls to 138.90 cc of a mixture of physiological salt solution (34 percent) and glycerin (66 percent), 20 P units were contained in 1 cc.)

It was recommended that the correctness of the assay of the toxin and antitoxin made by the authors be checked by (*a*) determination of the "test-dose" of the toxin against the standard antitoxin by means of intravenous injection into mice, and (*b*) assay of the antitoxin against this "test-dose" of toxin by intravenous injection of mice with mixtures of the "test-dose" of toxin with the amount of antitoxin used in determining the "test-dose" of toxin as well as amounts of antitoxin 10 percent above and 10 percent below this figure.

It was suggested that the standard antitoxin be diluted so that 1 cc of the solution would contain 5 P units and that the toxin be diluted so that 1 cc would contain 10 mg of toxin. The mixtures of standard antitoxin and toxin solution were prepared in such a manner that the dose of the mixture injected did not exceed 0.5 cc. A 3-day period of observation of the animals was recommended.

The tests suggested were carried out using the reagents submitted, and similar tests were carried out with our own standard antitoxin.

I. TESTS WITH INTERNATIONAL REAGENTS

(*a*) *Determination of the "test-dose" of toxin A/34.*—The toxin A/34 was tested against one unit of the international provisional standard, with the results shown in table 1. The mixture of the toxin and antitoxin was contained in 0.5 cc (0.2 cc of the antitoxin dilution (=1 P unit) and 0.195 to 0.255 cc of the toxin dilution plus sufficient normal salt solution to equal 0.5 cc). The results show a "test-dose" of 2.4 mg of the toxin, the value being slightly higher than that found by Walbum and Reymann, which might be accounted for by a slight deterioration of the toxin.

TABLE 1.—*Determination of the test dose of toxin A/34*

P. units antitoxin	Toxin A/34 milligrams	Number of mice	Mice surviving	
			Number	Proportion
1.0	1.95	6	6	6/6
1.0	2.10	6	6	6/6
1.0	2.25	6	6	6/6
1.0	2.40	6	3	3/6
1.0	2.55	6	2	2/6

(*b*) *Assay of the international provisional standard antitoxin.*—In order to check the titration of the toxin, the "test-dose" of toxin was tested against 1 unit of the international standard antitoxin and also against amounts of the antitoxin 10 percent above and 10 percent below 1 unit. The results as shown in table 2 confirm the results obtained in the determination of the "test-dose" of toxin.

TABLE 2.—*Assay of the provisional international histolyticus antitoxin*

P. units antitoxin	Toxin A/34 milligrams	Number of mice	Mice surviving	
			Number	Proportion
1.1	2.4	6	6	6/6
1.0	2.4	6	3	3/6
0.9	2.4	6	0	0/6

(*c*) *Titration of histolyticus antitoxin H of unstated potency.*—In the memorandum accompanying the reagents received from Dr. Madsen it was stated that the potency of the *histolyticus* antitoxin H lay between 200 and 400 units. For the preliminary tests a potency around 300 units per cubic centimeter was assumed. A 1/60 dilution of the antitoxin was made, so that 1 cc contained 5 of the assumed units and 0.2 cc of this dilution was equivalent to 1 unit. Titrations were made against the "test-dose" of toxin (2.4 mg). The results are shown in the accompanying protocol, table 3.

TABLE 3.—*Assay of international histolyticus antitoxin H*

P units tested for	Equivalent units per cc	Toxin A/34 milligrams	Number of mice	Mice surviving	
				Number	Proportion
1.5	200	2.4	6	6	6/6
1.3	230	2.4	6	6	6/6
1.2	250	2.4	6	5	5/6
1.1	272	2.4	6	2	2/6
1.0	300	2.4	6	0	0/6
0.9	333	2.4	6	0	0/6
0.8	374	2.4	6	0	0/6
0.75	400	2.4	6	0	0/6

A unitage in the neighborhood of 272 is indicated by the results of the test. In a second test the doses of antitoxin were spaced at closer intervals. The results are shown in table 4.

TABLE 4.—*Assay of histolyticus antitoxin II*

P units tested for	Equivalent units per cc	Toxin A/34 milligrams	Number of mice	Mice surviving	
				Number	Proportion
1	300	2.4	6	1	1/6
1.035	290	2.4	6	1	1/6
1.072	280	2.4	6	2	2/6
1.1	270	2.4	6	3	3/6
1.154	260	2.4	6	5	5/6
1.2	250	2.4	6	6	6/6

The results indicate a unitage of approximately 270–280 per cubic centimeter.

The reports of the various laboratories collaborating in the tests were presented at the meeting of the Permanent Commission on Biological Standardization in Geneva on September 30, 1935. The results of the testing of the antitoxin of unstated potency by the various participants in the project were in close agreement, as shown in the following tabulation:

	Units
Argentina: Istituto Bacteriologico	275–300
France: Pasteur Institute	300–350
Germany: Institut für Experimentelle Therapie "Emil von Behring"	250
Great Britain: National Institute for Medical Research	285
Wellcome Physiological Research Laboratories	270–300
Lister Institute of Preventive Medicine	285
United States of America: National Institute of Health	270–280
U. S. S. R.: State Institute "L. A. Tarassevitch"	275

II. TESTS WITH AMERICAN REAGENTS

STANDARD ANTITOXIN

The *histolyticus* serum used as the American standard was obtained from the Lederle Laboratories, Inc. It was received without preservative and was measured accurately soon after receipt in 10 cc amounts into 30-cc pyrex glass ampuls. After thorough drying over phosphorus pentoxide, a small agglutination tube containing phosphorus pentoxide was placed in each ampul. The air was evacuated and replaced by nitrogen, and the ampul was sealed.

The weights of the dried residue contained in 8 ampuls were determined with the following results: 0.9451 gram, 0.9442 gram, 0.9424 gram, 0.9456 gram, 0.9476 gram, 0.9431 gram, 0.9446 gram, 0.9445 gram. The average weight was 0.9445 gram, and the largest deviation from the mean was 0.32 percent.

The dried serum of one of the ampuls was dissolved and titrated against the "test-dose" of the toxin A/34 received from Dr. Madsen.

The dried serum was dissolved in 50 cc of saline, and from this dilutions were made up to 1/2000 for the preliminary test. The results are shown in table 5.

TABLE 5.—*Assay of the American standard histolyticus antitoxin against 2.4 mg of toxin A/34*

Preliminary test

Dilution of antitoxin	Amount of dilution	Number of mice used	Mice surviving	
			Number	Proportion
	cc			
1/50	0.2	3	3	3/3
1/100	.2	3	3	3/3
1/200	.2	3	3	3/3
1/500	.2	3	3	3/3
1/1000	.2	3	0	0/3
1/1500	.2	3	0	0/3
1/2000	.2	3	0	0/3

Dilutions were then made between 1/500 and 1/1000. The results are given in table 6.

TABLE 6.—*Assay of the American standard histolyticus antitoxin against 2.4 mg of toxin A/34*

Second test

Dilution of antitoxin	Amount of dilution	Number of mice used	Mice surviving	
			Number	Proportion
	cc			
1/500	0.2	3	3	3/3
1/600	.2	3	3	3/3
1/700	.2	3	2	2/3
1/800	.2	3	1	1/3
1/900	.2	3	0	0/3
1/1000	.2	3	0	0/3

From the results obtained it was assumed that 0.2 cc of the 1/850 dilution of the American Standard antitoxin was equivalent to 1 unit. Varying amounts of the 1/850 dilution were then tested against the "test-dose" of toxin A/34 with the following results:

TABLE 7.—*Assay of the American standard histolyticus antitoxin against 2.4 mg of toxin A/34*

Third test

Amount of 1/850 dilution of antitoxin	Number of mice used	Mice surviving		Amount of 1/850 dilution of antitoxin	Number of mice used	Mice surviving	
		Number	Proportion			Number	Proportion
0.24 cc	6	5	5/6	0.20 cc	6	0	0/6
0.23 cc	6	4	4/6	0.19 cc	6	0	0/6
0.22 cc	6	1	1/6	0.18 cc	6	0	0/6
0.21 cc	6	0	0/6				

From table 7 it can be seen that 0.23 cc of 1/850 dilution of the American standard antitoxin (equivalent to 0.2 cc of a 1/739 dilution) gave the most satisfactory results; and 0.2 cc of a 1/739 dilution of antitoxin was therefore considered as containing one unit.

The results show that 1 cc of a 1/739 dilution of the American *histolyticus* serum is equivalent to 1 cc of a 1/555.6 dilution of the international serum (1 cc of 1/138.9 diluted 1 to 4). Since it was considered desirable to dilute the glycerinated antitoxin in such a way that it would be diluted 1 to 10 in the final testing instead of 1 to 4 as the glycerinated international standard was diluted, the contents of one ampul were dissolved in 73.9 cc of a mixture of 66 percent glycerin and 34 percent normal salt solution so that 1 cc contained 50 units. One cubic centimeter of a 1/10 dilution of this glycerinated serum contains 5 units. The comparison between the international standard and the American standard may be expressed thus:

International standard antitoxin: 1 cc of $1/138.9 \times 1/4$ dilution contains 5 units.

American standard antitoxin: 1 cc of $1/73.9 \times 1/10$ dilution contains 5 units.

On the basis of the mean weight of the dried residue of 10 cc of the standard antitoxin (0.9445 gram) this amount contains 3,695 units and 1 unit is contained in 0.2556 mg of the standard antitoxin. This amount is therefore equivalent to 0.3575 mg of the dried international standard.

The American antitoxin diluted as indicated by the above results was tested against the international toxin A/34. One unit of antitoxin and amounts 10 percent above and 10 percent below one unit were tested against the "test dose", 2.4 mg of toxin. The results show that the antitoxin was correctly diluted, since one unit of antit·-in allowed four out of six mice to survive (table 8).

TABLE 8.—*Assay of American histolyticus antitoxin*

P units	Toxin A/34	Number of mice used	Mice surviving	
			Number	Proportion
	Mg			
1.1	2.4	6	6	6/6
1.0	2.4	6	4	4/6
0.9	2.4	6	0	0/6

STANDARD TOXIN

A dried *histolyticus* toxin was prepared as described in the following paper. This toxin was titrated against the American standard antitoxin and the "test-dose" determined. Titrations were made by the

methods of intravenous injection of mice and intracutaneous injections of guinea pigs.

(*a*) *Determination of the "test-dose" of the standard toxin on mice.*—The dried toxin which had an M. L. D. of 0.02 mg was tested against the American standard antitoxin using 40, 45, and 50 M. L. D. against 1 unit of the antitoxin. The toxin was diluted so that 1 cc contained 10 mg of toxin. The results are given in table 9.

TABLE 9.—*Determination of the "test-dose" of American histolyticus toxin A*

[Antitoxin constant (1 unit), toxin varied]

Units	Toxin	Number of mice used	Mice surviving	
			Number	Proportion
	Mg			
1.0	0.8	6	6	6/6
1.0	.9	6	3	3/6
1.0	1.0	6	0	0/6

The "test-dose" of the toxin was found to be 0.9 mg. For a further check on the "test-dose" the toxin was titrated against varying amounts of antitoxin with the toxin constant (0.9 mg). (Table 10.)

TABLE 10.—*Determination of the "test-dose" of the toxin*

[Antitoxin varied, toxin constant (0.9 mg)]

Units	Toxin	Number of mice used	Mice surviving	
			Number	Proportion
	Mg			
1.1	0.9	6	5	5/6
1.0	.9	6	2	2/6
.9	.9	6	0	0/6

To check further the "test-dose" of the American standard toxin, it was tested against the international *histolyticus* antitoxin H of unstated potency. As has been previously shown, this antitoxin was found to contain between 270 to 280 units per cc when tested against the "test-dose" (2.4 mg) of the international toxin. Taking 275 units per cc as the strength of the toxin, a 1/55 dilution was made so that 0.2 cc contained 1 unit, and this was tested against the "test-dose" (0.9 mg) of the American toxin. Table 11 gives the results.

TABLE 11.—*Assay of histolyticus antitoxin H*

Units antitoxin H	American standard toxin	Number of mice used	Mice surviving	
			Number	Proportion
	Mg			
0.9	0.9	6	0	0/6
1.0	.9	6	2	2/6
1.1	.9	6	6	6/6

(*b*) *Intracutaneous tests on guinea pigs.*—The intracutaneous test on guinea pigs for determining the "test-dose" of toxin was found to give very satisfactory and clear-cut results. The same dilutions used in the mouse intravaneous test were found applicable to the guinea pig intracutaneous test. The mixtures, however, were used in 0.2 cc amounts instead of 0.5 cc as in the mouse test, the 0.2 cc of the mixture containing 0.4 of a unit of antitoxin. White or yellow guinea pigs weighing from 300 to 400 grams were used. Readings were made at the end of 48 hours. The results obtained in titrating the toxin against a constant amount of antitoxin are shown in table 12.

TABLE 12.—*Intracutaneous testing on guinea pigs. Determination of "test-dose" of toxin*

[Antitoxin constant; toxin varied]

Toxin	Antitoxin	Reaction after 48 hours
Mg.	*Unit*	
0.32	0.4	+
.36	.4	++
.4	.4	+++

+++ large reaction; necrosis.
++ moderate reaction; slight necrosis.
+ small reaction.

The results obtained were checked by testing varying doses of antitoxin against the test dose of the toxin. The results are given in table 13.

TABLE 13.—*Intracutaneous testing on guinea pigs. Determination of the "test-dose" of toxin*

[Antitoxin varied; toxin constant (0.36 mg)]

Toxin	Antitoxin	Reaction after 48 hours
Mg	*Unit*	
0.36	0.36	+++
.36	.4	++
.36	.44	+

The slight reaction given by the smallest dose of toxin consisted of a small inflamed reddened area about 0.25 cm in diameter. The next dose, the one giving the ++ reaction which was adopted as the "test-dose" of the toxin showed a larger inflamed area about 1 cm in size with slight necrosis. The reaction produced by the largest dose showed extreme inflammation and marked necrosis.

The results attained by the intracutaneous test agree very well with those obtained by the mouse intravaneous test.

(*c*) *Potency of commercial and other antitoxins.*—Several antitoxins were available for testing. These included three commercial anti-

toxins all monovalent, one from Dr. Sordelli of the Argentine Republic and one from the Pasteur Institute. These were tested against the "test-dose" of the United States toxin with the following results:

1. Below 20 units per cubic centimeter.
2. 100 units per cubic centimeter.
3. Below 12 units per cubic centimeter.
4. 800 units per cubic centimeter.
5. 100 units per cubic centimeter.

In accordance with the international agreement regarding the size of the unit, the following statement was issued to the various biologics firms in this country:

NATIONAL INSTITUTE OF HEALTH,
25TH AND E STREETS NW.,
WASHINGTON, D. C., *July 6, 1936.*

It is proposed to adopt as the official unit for the measurement of the potency of *histolyticus* antitoxin the equivalent of the International Unit adopted by the Permanent Commission on Biological Standardization of the Health Organization of the League of Nations, this unit being that amount of antitoxin contained in a specified amount of the International serum. The equivalent of the International Unit is that amount of antitoxin contained in 0.2556 milligram of the dried standard serum prepared at the National Institute of Health. The dried serum as dissolved and diluted for distribution contains 50 units in 1 cc.

The standard unit will be distributed on special request addressed to the Director of the National Institute of Health.

It is expected that this unit will be employed by all producers not later than November 1, 1936.

G. W. MCCOY,
Director, National Institute of Health.

SUMMARY

The international unit for measuring the potency of gas gangrene antitoxin (*histolyticus*) adopted at a meeting of the Permanent Standards Commission of the Health Organization of the League of Nations in September 1935, at Geneva, has been adopted as the American unit.

The National Institute of Health collaborated with other foreign institutions in checking the assay of the international standard reagents, prepared in the laboratory of the State Serum Institute at Copenhagen. Tests to determine the strength of a specimen of antitoxin of unknown potency by the eight laboratories participating in the project show close agreement.

A standard antitoxin for use in this country has been prepared and its potency measured in terms of the international standard. One unit of the international standard antitoxin contained in 0.3575 mg of the dried serum is equivalent to 0.2556 mg of the United States dried serum. Glycerinated solutions of our standard are prepared in such a manner that 1 cc contains 50 units.

A dried toxin was prepared and the "test-dose" determined against 1 unit of the United States standard antitoxin. The "test-dose" was 0.9 mg of toxin (approximately 45 minimal lethal doses).

Tests are carried out by the intravenous inoculation of mice or the intracutaneous inoculation of guinea pigs In control tests with the standard antitoxin, 1 unit of antitoxin is tested against the test dose of toxin in mice. The same mixtures may be used in the intracutaneous tests on guinea pigs, employing a dose of 0.4 unit of antitoxin against 0.4 of the "test-dose" of toxin.

STUDIES ON THE PRODUCTION OF TOXIN BY CLOSTRIDIUM HISTOLYTICUM

By Sarah E. Stewart, *Assistant Bacteriologist, National Institute of Health, United States Public Health Service*

This paper is concerned with experimental work in the production of a potent *histolyticus* toxin with particular reference to the influence of the reaction of the medium, the length of the incubation period, the effect of the addition of the glucose, and the results obtained by the use of two different peptones, Parke-Davis and Witte.

Twenty-three strains of *Clostridium histolyticum* were tested for their virulence in mice by intravenous inoculations, and of these the most virulent was selected and used for toxin production. This strain was H 32, received from Dr. R. S. Spray, of the University of West Virginia Medical School.

INFLUENCE OF THE HYDROGEN ION CONCENTRATION OF THE MEDIUM

A relatively strong toxin was obtained by culturing the bacillus in 1-percent Parke-Davis meat infusion broth with a pH of 7.6. At the beginning of the work the pH of the medium seemed to be of considerable importance. With media having pH values above 7.4 the toxin produced would be increasingly weaker the more alkaline the media. Later, however, it was found that a variation in pH from 6.8 to 7.8 gave little difference in the strength of the toxin produced when the medium was suitable in other respects and when conditions of anaerobiosis were favorable.

PERIOD OF INCUBATION

The period of incubation was found to be of considerable importance, 13 to 15 hours giving the maximum toxin production. With an increase in the period of incubation, a decrease in toxicity was observed; this increase in the incubation was accompanied by an increase in alkalinity. This is illustrated in figure 1. The optimum period of incubation, however, seems to vary with the type of medium

used. Mita (*1*), with a liver infusion broth, obtained the most potent toxin after 24 hours' incubation.

EFFECT OF ADDITION OF GLUCOSE TO THE MEDIUM

Although *Cl. histolyticum* is nonsaccharolytic, Weinberg and Randin (*2*) were able to show that if 2 percent glucose were added to the medium a stronger toxin would be produced. Their work has been confirmed in these studies. To demonstrate the effect of glucose on toxin production, a sugar-free meat infusion broth (coli-

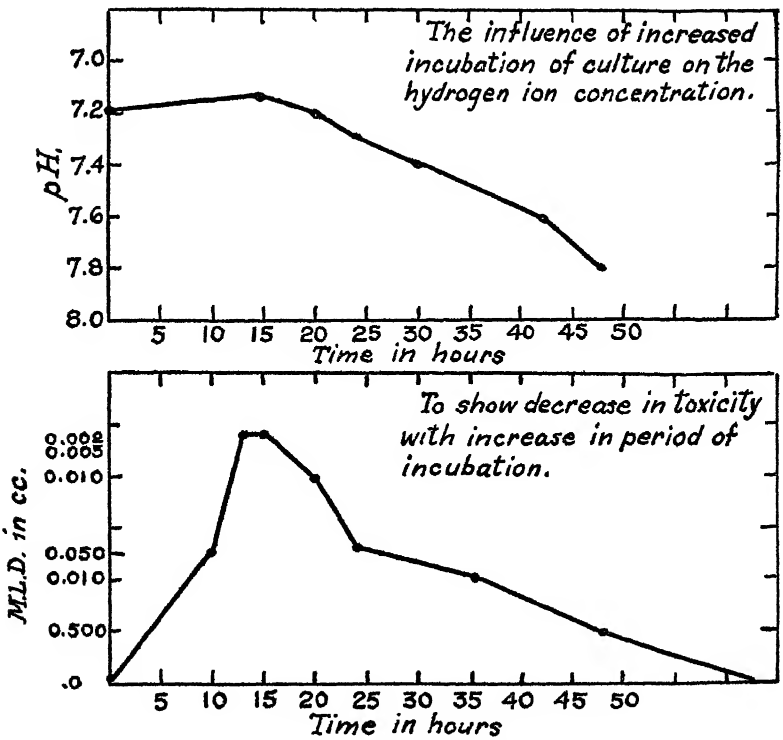


FIGURE 1.—Relation of alkalinity and toxicity to incubation period

fermented) was used. Two percent glucose was added to one lot of broth, 1 percent to another, and some was left sugar free. All were enriched with 5 percent horse serum. The flasks were inoculated and incubated for 15 hours, then filtered and the M. L. D. of the toxins was determined. The results are given in table 1. The broth containing the 2 percent glucose gave the strongest toxin. All however, were relatively weak, as the broth did not provide a suitable medium for the growth of *Cl. histolyticum*. This experiment was therefore repeated with ordinary meat infusion peptone broth (Parke-Davis) with and without glucose. Here again the broth

containing the 2 percent glucose gave the strongest toxin. This is shown in table 2.

TABLE 1.—*The effect of adding glucose to sugar-free broth (coli-fermented) on the toxin production by Cl. histolyticum*

Filtrate from 15-hour cultures	Amount of toxin	Number of mice used	Number of deaths
Sugar-free broth plus 5 percent horse serum	Cc 0.5 .1 .05 .01	6 6 6 6	5 0 0 0
Sugar-free broth plus 5 percent horse serum plus 1 percent glucose	.5 .1 .05 .01	6 6 6 6	6 3 0 0
Sugar-free broth plus 5 percent horse serum plus 2 percent glucose	.5 .1 .05 .01	6 6 6 6	6 6 0 0

TABLE 2.—*The effect of adding glucose to nutrient broth used on the production of toxin by Cl. histolyticum*

Filtrate from 15-hour cultures	Amount of toxin used	Number of mice used	Number of deaths
Nutrient broth; no glucose	Cc 0.5 .1 .05 .01 .005 .002	12 12 12 12 12 12	12 12 8 6 0 0
Nutrient broth plus 1 percent glucose	.5 .1 .05 .01 .005 .002	12 12 12 12 12 12	12 12 11 6 0 0
Nutrient broth plus 2 percent glucose	.5 .1 .05 .01 .005 .002	12 12 12 12 12 6	12 12 12 12 9 6

As an increase in acidity did not result after growing *Cl. histolyticum* in glucose broth, it was inferred that the glucose was utilized in some other manner. However, quantitative sugar determinations showed that there was no decrease in the amount of reducing substances present after a 15-hour growth of the culture. These determinations were made by the Shaffer-Hartman Cooper reduction method.

Since direct correlation between hemolytic activity and virulence is often encountered with many of the pathogenic bacteria, the possibility was considered that a hemolysin might account for the dif-

ferences in the toxicity of the glucose and glucose-free cultures of *Cl. histolyticum.* Weinberg and Seguin (*3*), also Hall (*4*), have shown that *Cl. histolyticum* does not hemolyze the red blood corpuscles of animal tissues. Mita (*1*), however, was able to demonstrate a hemolysin *in vitro* in liver broth cultures. In our work a hemolysin could not be demonstrated in the plain broth cultures, but a strong hemolysin was shown to be present in the 2 percent glucose broth cultures. It was necessary to use young cultures of 13 to 15 hours' growth in order to demonstrate a hemolysin, as it appears to be very unstable. The method proposed by Todd (*5*) for streptolysins was used. Table 3 gives the hemolysin titer obtained using varying amounts of culture against 0.5 cc of a 5 percent suspension of washed rabbit red blood corpuscles.

TABLE 3.—*Effect of glucose on the production of a hemolysin by C. histolyticum*

Amounts of culture used	13-hour 2-percent glucose broth culture	13-hour 1-percent glucose broth culture	13-hour plain broth culture; no glucose added
Cc			
0.4	++++	++++	+
0.35	++++	++++	+
0.3	++++	+++±	+
0.25	++++	+++±	±
0.2	++++	+++	±
0.16	++++	+++	±
0.14	++++	+++	±
0.12	++++	+++	±
0.1	++++	++	±
0.08	+++	++	−
0.06	++	+	−
0.04	+	+	−

Other reducing sugars such as maltose and galactose were found to give the same results as glucose. Nonreducing carbohydrates such as lactose and glycerine, however, did not stimulate hemolysin production.

It was considered that the presence of reducing sugars might stimulate the bacterial growth and thus account for the increased toxicity and for the presence of a hemolysin. Bacterial counts on the viable organisms, however, did not show this, as can be seen from table 4.

TABLE 4.—*Correlation between hemolysin production and the potency of the toxins in 13-hour cultures and its relationship to the number of viable organisms present*

Cultures	Hemolysins	M. L. D. of toxin	Number of bacteria
		Cc	*Cc*
Nutrient broth culture	Negative	0.05	3,000,000 per
2-percent glycerine nutrient broth	do	.05	4,000,000 per
2-percent galactose nutrient broth	4 plus with 0.1 cc	.01–.005	4,000,000 per
2-percent glucose nutrient broth	do	.005	3,000,000 per

Glucose also appears to favor proteolysis. This was not marked, but seems significant. Figure 2 illustrates the differences in digestion produced on milk agar plates by filtrates of cultures grown with and without glucose.

Reduced oxygen tension has been shown to favor certain types of proteolysis. Grossman, Dykerhoff, and Schoenebeck (*7*), also Waldschmidt-Leitz, Purr, and Ball (*8*), have shown that reduced glutathione acts as an activator of proteolytic enzymes of the cathepsin type. Voegtlin and Maver (*9*), in studying the *in vitro* autolysis of two malignant tumors, found that reduced oxygen tension activates tissue proteolysis and that it apparently operates through its influence on the sulphydryl system of the tissue.

Most hemolysins are known to be readily oxidized. Schwachman, Hellerman, and Barnett (*6*) have shown some of the ways by which the activity of pneumococcal hemolysin is controlled by oxidation and reduction. They demonstrated that the presence of sulphydryl groups could prevent its inactivation by preventing its oxidation.

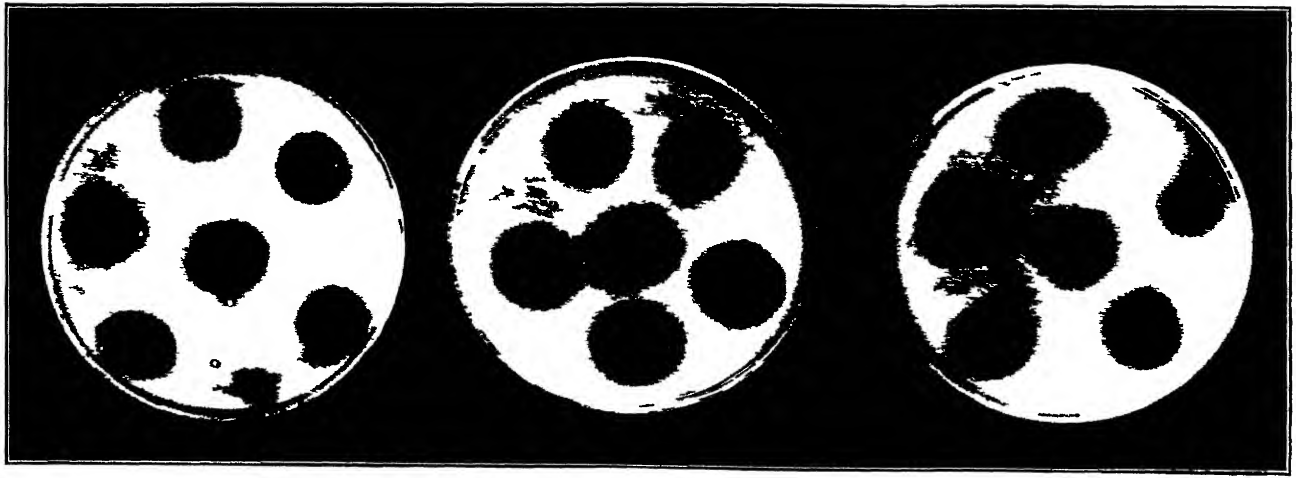
It appears that the glucose in cultures of *Cl. histolyticum* may stimulate the production of a hemolysin and cause an increase in proteolysis, as shown on milk agar plates because of its reducing action. The effect of adding other reducing substances to the media was therefore tried.

Witte peptone, which is high in sulphydryl groups, was substituted for the Parke-Davis peptone; also, 0.1 percent cystine was added to the Parke-Davis peptone meat infusion broth. These were compared with the Parke-Davis meat infusion broths with and without glucose as to the strength of the toxins and hemolysins produced and for the presence of sulphydryl groups as shown by the sodium nitroprusside test. The results are given in table 5.

TABLE 5.—*A comparison of toxin production, etc., by Cl. histolyticum when grown in media of different reducing potentials*

Medium	M. L. D. of toxin	Hemolysin of red blood cells	Sodium nitroprusside test for sulphydryl groups
	Cc		
1 percent Witte meat infusion	0.002-0.005	++++	+++
2 percent Witte meat infusion	0.002-0.005	++++	++++.
1 percent Parke-Davis meat infusion	0.01 -0.05	Negative	Negative
2 percent Parke-Davis meat infusion	0.01 -0.05	Negative	+
1 percent Parke-Davis meat infusion+0.1 percent cystine	0.01 -0.05	Negative	+++++.
1 percent Parke-Davis meat infusion+2 percent glucose	0.002-0.005	++++	Negative.

The Witte peptone meat infusion broth cultures were found to give the most potent toxins, having an M. L. D. of 0.002 cc to 0.005 cc for a 17–20-gram mouse. A strong hemolysin was also produced; 0.1 cc



No glucose 1% glucose 2% glucose

FIGURE 2.—Showing the difference in digestion produced on milk agar plates by filtrates of cultures of *Cl histolyticum* grown with and without glucose

of the cultures gave complete hemolysis of 0.5 cc of a 5 percent suspension of washed rabbit red blood corpuscles. The sodium nitroprusside test for the presence of sulphydryl groups was strongly positive. With the 1 percent Parke-Davis peptone meat infusion broth containing the 0.1 percent cystine a strong sodium nitroprusside test was also given, but here the hemolysin was entirely absent. The M. L. D. was also found to be much lower, varying from 0.01 cc to 0.05 cc for a 17–20-gram mouse. The Parke-Davis peptone meat infusion broth containing the 2 percent glucose gave a strong hemolysin and a much stronger toxin than the Parke-Davis peptone meat infusion broth without glucose. The M. L. D. varied between 0.002 cc and 0.005 cc, as compared with 0.01 cc to 0.05 cc for the broth cultures without glucose. The sulphydryl test was negative for both. No correlation was obtained between the toxicity (and hemolysins) and reduction of the media as shown by the presence of sulphydryl groups.

Estimations of the amount of reduction of the cultures in the different media were then made. Dyes (*10*) were used to measure the amount and the speed of reduction. These were used in the media in amounts that gave approximately the same color intensities for each dye. Small flasks or test tubes containing the media with the specific dye were heated in streaming steam for one hour to expel the free oxygen, cooled to about 40° C., and then inoculated with a young culture of *Cl. histolyticum*. These were sealed with a layer of vaseline and incubated at 37.5° C. Observations were made at 5-minute intervals, and the reduction of the different dyes was recorded. A buffer was not added to the media as there was no appreciable change in the pH of the cultures after 15 hours' incubation.

Results obtained are given in table 6.

TABLE 6.—*To show the rate of reduction of dyes by cultures of Cl. histolyticum grown on the different media*

Media pH 7.6	Methylene blue	Indigo carmine	Phenosafranine	Betaine viologen
1 percent Witte peptone meat infusion	30 minutes.	45 minutes.	5 hours.	15 hours.
1 percent Parke-Davis peptone meat infusion plus 2 percent glucose	15 minutes	30 minutes.	5 hours	Not reduced.
1 percent Parke-Davis peptone meat infusion	30 minutes.	45 minutes	5 hours.	Do.

Although at the end of 15 hours' incubation no appreciable difference could be noted in the state of reduction between the Parke-Davis meat-infusion broth cultures with glucose and those without glucose, the rate of reduction was found to be more rapid in the glucose broth cultures. The Witte peptone-meat-infusion broth cultures, however, showed a much greater reduction at the end of the period of incuba-

tion. With betaine viologen as an indicator, about 20 percent reduction of the dye was observed.

From these investigations it appears that the production of a hemolysin and of a more potent toxin by the glucose broth cultures and the Witte peptone-meat-infusion broth cultures may be accounted for by the greater reducing power of these media.

PREPARATION OF TOXIN USED IN THE STANDARDIZATION OF HISTOLYTICUS ANTITOXIN [1]

A 1-percent Witte peptone-meat-infusion broth with a pH of 7.6 was used for the production of 60 liters of *histolyticus* toxin. Two-liter flasks were filled with sterile broth, heated one hour in streaming steam, and cooled to about 40° C. Each flask was inoculated with 10 cc of a 24-hour growth of the culture. The flasks were incubated at 37.5° C. for 15 hours. The cultures were then filtered through sterile paper pulp and then through Mandler filters. The toxin was precipitated from the 60 liters of filtrate with ammonium sulphate, using 750 grams per liter. The toxin formed a firm layer which was easily skimmed off. The precipitate was transferred to a Buchner funnel containing a layer of filter paper, and as much as possible of the fluid was removed by means of suction and the use of a dental rubber dam. The toxin was dried over phosphorus pentoxide and then ground thoroughly in a ball mill. The yield was 244 grams with an M. L. D. of 0.02 milligrams for a 17- to 20-gram mouse when inoculated intravenously.

THE STABILITY OF THE TOXIN UNDER DIFFERENT CONDITIONS OF EXPOSURE

Tests were made to determine the effects of variations of temperature and light on the toxin. Specimens of the dry toxin with a "test dose" of 0.9 mg were placed in dry, sterile ampuls, stoppered, and exposed to the following conditions:

1. To sunlight outside window.
2. At room temperature in the dark.
3. In warm room (37.5° C.) in the dark.
4. In cold room (4° to 5° C.) in vacuum jar.

After being exposed 1 month under the described conditions, the "test dose" of each was determined and found to be as follows:

	Mg
1. Exposure to sunlight outside window	1. 0
2. At room temperature in the dark room	1. 0
3. In warm room (37.5° C.) in the dark	1. 1
4. In cold room (4° to 5° C.) in vacuum jar	. 9

[1] See preceding article on the standardization of *histolyticus* antitoxin

SUMMARY

1. Meat infusion broth containing 1 percent Witte peptone is a suitable medium for the production of *Cl. histolyticum* toxin. Thirteen to fifteen hours' incubation at 37.5° C. was found to give maximum toxin production. The M. L. D. (intravenous in mice) varied between 0.002 and 0.005 cc. A 2 percent glucose meat infusion broth containing 1 percent Parke-Davis peptone was found to give a toxin of the same potency, but the results were not as regular.

2. Both the Witte peptone meat infusion broth cultures and the 2 percent glucose Parke-Davis peptone meat infusion broth cultures produced strong hemolysins as contrasted with the Parke-Davis meat infusion broth cultures without glucose, which were negative for hemolysins and which had a definitely lower M. L. D. The greater toxicity of the cultures containing glucose appears to be due to the reducing action of the glucose. The cultures containing Witte peptone showed the greatest amount of reduction after 15 hours' incubation.

3. The dried toxin appears to be quite stable. Little deterioration took place after exposure to sunlight and to a temperature of 37.5° C. for 30 days.

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(2) Weinberg, M., and Randin, A.: Propriétés physico-chimiques du ferment fibrolytique d'origine microbienne. Compt. rendu de la Soc. Biol., 110: 352 (1932).
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(4) Hall, I. C., and Peterson, E.: A note on the mechanism of the peculiar lesions produced by B. histolyticus. Proc. Soc. Exper. Biol. and Med., 20: 502 (1932).
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(6) Schwachman, H., Hellerman, L., and Barnett, C.: Reversible inactivation of pneumococcal hemolysin; effects of oxidation reduction and of metal compounds. Jour. Biol. Chem., 107: 257 (1934).
(7) Grossman, W., Dyckerhoff, H., and Shoenebeck, O.: Zeitschr. f. physiol. Chem., 186: 183 (1929–1930).
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(9) Voegtlin, C., and Maver, M. E.: Relation of oxidation to proteolysis in malignant tumors. Pub. Health Rep., 47: 711 (1932).
(10) Clark, W. Mansfield.: The potential energies of oxidation-reduction systems and their biochemical significance. Medicine, 13: 207 (1934).

PLAGUE FOUND IN PRAIRIE DOGS (CYNOMYS PARVIDENS) IN UTAH

Under date of August 26, 1936, Surgeon C. R. Eskey, of the United States Public Health Service plague laboratory in San Francisco, California, reported that plague had been demonstrated, by mass

inoculation of tissue material and cultures, in prairie dogs (*Cynomys parvidens*) shot on August 6, 1936, on a ranch 5 miles north-east of Panguitch, Garfield County, Utah. The report stated that cultures made on the usual media for differentiating *Pasteurella pestis* gave typical reactions for the plague organism. A guinea pig inoculated cutaneously from a blood agar plate was dead on the third day, and one inoculated subcutaneously from a plain agar culture was dead on the fourth day, demonstrating the high virulence of the material used. The macroscopic autopsy findings and microscopical examination of smears indicated a typical plague infection in both guinea pigs.

Previously plague infection had been demonstrated in fleas taken from 23 prairie dogs shot on a ranch 2 mile east of Hatch, in Garfield County; and a fatal epizootic among these animals had been reported in Utah and Montana.

It is believed that the finding of plague infection in fleas taken from prairie dogs was the first direct evidence that the disease existed in this animal in the United States, and that the subsequent report is the first record of plague being recovered from the tissues of prairie dogs in this country.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period January–June 1936

There is printed herewith a list of publications of the United States Public Health Service issued during the period January–June 1936.

The most important articles that appear each week in the PUBLIC HEALTH REPORTS are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and as long as the supply lasts may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution but, unless stated to be "out of print", may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted.* (No remittances should be sent to the Public Health Service.)

Periodicals

*Public Health Reports (weekly), January–June, vol. 51, nos. 1–26, pages 1 to 870. 5 cents a copy.

*Venereal Disease Information (monthly), January–June, vol. 17, nos. 1–6, pages 1 to 176. 5 cents a copy.

Reprints From the Public Health Reports

1725. The typhoid control program and results of 13 years' work in Williamson County, Tennessee, 1922 35. By W. C. Williams and E. L. Bishop. January 3, 1936. 15 pages.
1726. City smoke and its effects. A statement prepared for the congressional Subcommittee on Public Health, Hospitals, and Charities. January 3, 1936. 4 pages.
1727. Diets of low-income families surveyed in 1933. Health and depression studies no. 3. By Dorothy G. Wiehl. January 24, 1936. 21 pages.
1728. Calcium cyanide dust in ship fumigation. By C. L. Williams. February 7, 1936. 4 pages.
1729. Milk-sanitation status of urban communities. Urban communities in which pasteurized milk is both properly produced and properly pasteurized, and in which raw milk is at least properly produced, as shown by ratings of 90 percent or more reported by the State milk-sanitation authorities during the period January 1, 1934, to December 31, 1935. February 7, 1936. 4 pages.
1730. Results of field studies with the Brodie poliomyelitis vaccine. By A. G. Gilliam and R. H. Onstott. February 14, 1936. 12 pages.
1731. The place of mental hygiene in a Federal health program. By Walter L. Treadway. February 21, 1936. 13 pages.
1732. Prevention of experimental intranasal infection with certain neurotropic viruses by means of chemicals instilled into the nostrils. By Charles Armstrong and W. T. Harrison. February 28, 1936. 13 pages.
1733. Prevention of intravenously inoculated poliomyelitis of monkeys by intranasal instillation of picric acid. By Charles Armstrong. March 6, 1936. 3 pages.
1734. Biological products. Establishments licensed for the propagation and sale of viruses, serums, toxins, and analogous products. March 6, 1936. 6 pages.
1735. The official United States and international unit for standardizing gas gangrene antitoxin (oedematiens). By Ida A. Bengtson. March 13, 1936. 10 pages.
1736. Results of a dental examination of 1,908 white and colored males at the Ohio State Reformatory. By W. M. Gafafer and C. T. Messner. March 27, 1936. 12 pages.
1737. The picture of heart disease mortality obtained from vital statistics in Washington, D. C., during 1932. By O. F. Hedley. March 20, 1936. 14 pages.
1738. Changes in the incidence and fatality of smallpox in recent decades. By A. W. Hedrich. April 3, 1936. 30 pages.
1739. Acute response of guinea pigs to vapors of some new commercial organic compounds. IX. Pentanone (methyl propyl ketone). By W. P. Yant, F. A. Patty, and H. H. Schrenk. April 3, 1936. 8 pages.
1740. History and frequency of smallpox vaccinations and cases in 9,000 families. Based on Nation-wide periodic canvasses, 1928–31. By Selwyn D. Collins. April 17, 1936. 37 pages.
1741. Public Health Service publications. A list of publications issued during the period July–December 1935. April 17, 1936. 3 pages.
1742. An occupational dermatitis due to heat decomposition of dyes. By Louis Schwartz and C. D. Hocker. April 24, 1936. 17 pages.
1743. Mortality in certain States during 1935 with comparative data for recent years. May 1, 1936. 10 pages.

1744. The significance of infant mortality rates. By Mayhew Derryberry and Edgar Van Buskirk. May 1, 1936. 7 pages.
1745. A comparative study of certain characteristics of 1,000 inmates of the Northeastern Penitentiary. I. Age. By Barkev S. Sanders. May 8, 1936. 21 pages.
1746. Studies of sewage purification. IV. The use of chlorine for the correction of sludge bulking in the activated sludge process. By Russell S. Smith and W. C. Purdy. May 15, 1936. 7 pages.
1747. Acute response of guinea pigs to vapors of some new commercial organic compounds. X. Hexanone (methyl butyl ketone). By H. H. Schrenk, W. P. Yant, and F. A. Patty. May 15, 1936. 8 pages.
1748. Sickness among male industrial employees during the final quarter of 1935 and the entire year. By Dean K. Brundage. May 22, 1936. 3 pages.
1749. Engineering control of occupational diseases. By J. J. Bloomfield. May 22, 1936. 13 pages.
1750. The preparation of a concentrate of vitamins B_1 and B_2 from brewers' yeast. By Maurice I. Smith and Atherton Seidell. May 29, 1936. 4 pages.
1751. Application of the preliminary sanitary survey to flooded areas. By J. M. DallaValle and J. J. Bloomfield. May 29, 1936. 6 pages.
1752. Rat-proof construction and its effect on the control of rat life on ships. Instances of permanent and apparent automatic control effected by this type of construction observed on 50 ships at the port of New York. By B. E. Holsendorf. May 29, 1936. 13 pages.
1753. Smallpox immunity in 5,000 college students. By R. C. Bull and S. L. Rankin. June 5, 1936. 13 pages.
1754. The development of a technique for measuring the knowledge and practice of midwives. By Mayhew Derryberry and Josephine Daniel. June 12, 1936. 15 pages.
1755. Marine hospitals and beneficiaries of the Public Health Service. By S. L. Christian. June 19, 1936. 13 pages; 3 plates.
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1757. Relation of physical defects to the physical growth of children of 21 States. Physical measurement studies no. 3. By William M. Gafafer. June 26, 1936. 11 pages.

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223. Observations on Indian health problems and facilities. By Joseph W. Mountin and J. G. Townsend. February 1936. 47 pages.
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225. Some features of tuberculosis mortality distribution in the United States. By L. L. Lumsden and C. C. Dauer. March 1936. 39 pages.
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227. A survey of dental activities of State departments and institutions of the United States. By F. C. Cady, H. T. Dean, and C. T. Messner. June 1936. 217 pages.

National Institute of Health Bulletin

166. Epidemic amoebic dysentery. The Chicago outbreak of 1933. By Herman N. Bundesen, Joel I. Connolly, Isaac D. Rawlings, Arthur E. Gorman, George W. McCoy, and Albert V. Hardy. March 1936. 187 pages.

Annual Report

*Annual Report of the Surgeon General of the United States Public Health Service for the fiscal year 1935. 158 pages. 75 cents.

Unnumbered Publications

Index to Public Health Reports, vol. 50, part 2 (July–December 1935). 1936. 22 pages.

*National Negro Health Week program. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Twenty-second annual observance. 1936. 8 page folder.

*National Negro Health Week poster. Twenty-second annual observance. 1936.

*National Negro Health Week leaflet. Twenty-second annual observance. 1936. 2 pages.

Reprints from Venereal Disease Information

53. Syphilis Control in New York State. By Thomas Parran. Vol. 16, No. 9. 6 pages.

Supplements to Venereal Disease Information

1. The evaluation of serodiagnostic tests for syphilis in the United States. Detailed report of results. By H. S. Cumming, H. H. Hazen, Arthur H. Sanford, F. E. Senear, Walter M. Simpson, and R. A. Vonderlehr. 49 pages.

Venereal Disease Bulletin

89. Facts about syphilis, gonorrhea, and other venereal diseases. 33 pages.

DEATHS DURING WEEK ENDED AUG. 22, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 22, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,368	7,073
Deaths per 1,000 population, annual basis	10.3	9.9
Deaths under 1 year of age	470	499
Deaths under 1 year of age per 1,000 estimated live births	42	46
Deaths per 1,000 population, annual basis, first 34 weeks of year	12.6	11.7
Data from industrial insurance companies:		
Policies in force	68,205,792	67,486,280
Number of death claims	11,329	10,830
Death claims per 1,000 policies in force, annual rate	8.7	8.4
Death claims per 1,000 policies, first 34 weeks of year, annual rate	10.3	10.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 29, 1936, and August 31, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 29, 1936, and Aug. 31, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935
New England States:								
Maine	1		1		21	9	0	0
New Hampshire							0	0
Vermont	1					6	0	0
Massachusetts	3	4			27	21	1	1
Rhode Island					1	5	0	0
Connecticut	1	2	1		3	5	1	3
Middle Atlantic States:								
New York	12	19	[1] 2	[1] 6	75	127	9	14
New Jersey	6	4	6	1	26	14	2	3
Pennsylvania	17	20			47	83	4	4
East North Central States:								
Ohio	17	9	8	34	13	27	1	3
Indiana	5	16	4	20	3	2	2	0
Illinois [2]	25	22	2	4	11	15	2	5
Michigan	3			2	14	27	3	0
Wisconsin		6	12	16	16	63	1	1
West North Central States:								
Minnesota	2	1	3	1	4	2	0	2
Iowa	5	5	1	1		2	1	0
Missouri	10	25	9	18		6	2	2
North Dakota	4		1		1	1	0	1
South Dakota		1			1		1	0
Nebraska	5	2			3	6	0	8
Kansas	5	1			2	8	0	1
South Atlantic States:								
Delaware [2]		1				2	0	2
Maryland [3]	3	3		1	6	9	3	8
District of Columbia		8			4		1	2
Virginia [2]	22	24			16	1	2	8
West Virginia	11	22	9	51	2	17	1	3
North Carolina [2]	36	36	5	4	6		2	2
South Carolina [4]	4	8	53	51	6		1	0
Georgia [4]	12	16					1	2
Florida [4]	1	19	1		1	1	3	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 29, 1936, and Aug. 31, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935
East South Central States:								
Kentucky	11	38	12	3	15	9	3	2
Tennessee	17	24	7	2		1	2	0
Alabama [4]	26	21	1	39	4	13	2	0
Mississippi [3]	13	21					0	0
West South Central States:								
Arkansas	4	12	8	1			0	0
Louisiana [4]	9	24	23	20		8	2	1
Oklahoma [5]	6	8	8	7	3		0	0
Texas [4]	28	58	8	12	18	29	0	0
Mountain States:								
Montana [2]	1	1		1		4	1	0
Idaho					1		0	0
Wyoming						11	0	0
Colorado	3	9				1	0	0
New Mexico	5	1			1		0	0
Arizona	2	2	17	6	16	1	2	0
Utah [3]	1				3		0	0
Pacific States:								
Washington		1			4	5	0	2
Oregon [2]	1	2	4		4	69	2	1
California	24	24	14	3	43	82	1	5
Total	362	529	215	310	421	602	59	71
First 35 weeks of year	15,802	19,098	142,123	104,679	270,909	696,904	6,068	4,292

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935
New England States:								
Maine	1	16	7	13	0	0	3	4
New Hampshire	0	6		2	0	0	0	1
Vermont	0	2	4	0	0	0	0	0
Massachusetts	3	166	26	38	0	0	4	2
Rhode Island	0	58	11	1	0	0	0	0
Connecticut	0	39	3	13	0	0	4	3
Middle Atlantic States:								
New York	10	460	53	80	0	0	41	29
New Jersey	2	35	16	10	0	0	11	8
Pennsylvania	6	13	59	65	0	0	24	23
East North Central States:								
Ohio	14	14	69	49	1	0	28	49
Indiana	1	2	11	29	0	0	20	18
Illinois [2]	19	19	82	93	3	0	25	28
Michigan	3	108	51	33	0	7	5	18
Wisconsin	1	4	69	55	0	1	1	1
West North Central States:								
Minnesota	2	5	18	35	0	0	2	8
Iowa	2	4	10	25	2	0	8	3
Missouri	1	0	19	19	2	0	27	19
North Dakota	0	1	3	4	0	0	0	1
South Dakota	0	0	4	6	0	3	0	2
Nebraska	0	0	5	2	1	2	0	0
Kansas	1	2	17	10	1	1	19	15
South Atlantic States:								
Delaware [2]	1	2		5	0	0	0	7
Maryland [3]	0	5	11	17	0	0	9	26
District of Columbia	1	5		4	0	0	0	5
Virginia [2]	5	31	12	23	0	0	19	30
West Virginia	1	8	12	47	0	0	9	18
North Carolina [2]	0	9	24	25	0	0	26	19
South Carolina [4]	1	1		3	0	1	18	24
Georgia [4]	10	0	10	6	0	0	38	45
Florida [4]	4	0	4	3	0	0	2	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 29, 1936, and Aug. 31, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935	Week ended Aug. 29, 1936	Week ended Aug. 31, 1935
East South Central States:								
Kentucky	7	36	13	40	0	0	56	70
Tennessee	19	1	8	16	0	0	33	85
Alabama [4]	16	4	13	11	0	0	36	16
Mississippi [3]	15	0	8	14	0	0	9	9
West South Central States:								
Arkansas	0	0	2	8	0	0	12	9
Louisiana [4]	0	1	7	10	0	0	23	19
Oklahoma [5]	0	0	7	4	0	0	16	41
Texas [4]	1	9	15	21	0	4	43	59
Mountain States:								
Montana [2]	0	0	4	5	8	0	5	7
Idaho	0	0	1	1	0	0	2	2
Wyoming	0	0	4	6	1	0	1	0
Colorado	2	0	6	11	0	0	1	6
New Mexico	1	0	9	4	0	0	18	14
Arizona	0	1	1	1	0	0	4	2
Utah [3]	0	0	10	14	2	0	0	2
Pacific States:								
Washington	2	1	15	9	0	3	3	4
Oregon [1]	0	1	16	16	0	0	2	8
California	12	24	65	40	0	5	12	11
Total	164	1,088	844	955	21	27	614	721
First 35 weeks of year	1,604	5,417	185,600	182,211	6,317	5,368	8,081	10,718

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Aug. 29, 1936, 10 cases, as follows: Illinois, 1; Delaware, 2; Virginia, 2; North Carolina, 1; Montana, 3; Oregon 1.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended Aug. 29, 1936, 73 cases, as follows: South Carolina, 1; Georgia, 38; Florida, 1; Alabama, 24; Louisiana, 3; Texas, 6.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1936										
Missouri	13	73	99	104	66		1	348	22	46
July 1936										
Arizona	4	8	49	7	197		1	19	0	17
Massachusetts	6	38		1	1,283	2	4	257	0	49
Missouri	8	30	61	201	68	3	3	157	25	62
Montana	2	1	3		11		2	75	62	12
New York	30	136		6	3,064		19	739	0	47
Oregon	1	2	17	4	40			39	5	17
South Dakota	2	4	11		9		1	33	14	8
Vermont					69		5	15	0	5
Virginia	14	19	63	43	215	23	3	45	0	50
Washington	1	1	5		217		10	48	6	15

Summary of Monthly Reports from States—Continued

June 1936

	Cases
Missouri:	
Chicken pox	78
Dysentery	41
Epidemic encephalitis	1
Mumps	115
Ophthalmia neonatorum	2
Rabies (in animals)	16
Septic sore throat	33
Trachoma	58
Tularaemia	2
Undulant fever	4
Whooping cough	76

July 1936

	Cases
Anthrax:	
Arizona	1
Massachusetts	1
New York	1
Chicken pox:	
Arizona	14
Massachusetts	312
Missouri	43
Montana	35
New York	814
Oregon	28
South Dakota	2
Vermont	24
Virginia	33
Washington	106
Dysentery:	
Arizona	27
Missouri	110
New York (amoebic)	3
New York (bacillary)	23
Virginia (diarrhea included)	515
Epidemic encephalitis:	
Arizona	1
New York	9
Oregon	2
South Dakota	1
Washington	4

July 1936—Continued

	Cases
German measles:	
Arizona	24
New York	175
Vermont	12
Washington	36
Impetigo contagiosa:	
Oregon	11
Mumps:	
Arizona	107
Massachusetts	446
Missouri	63
Montana	74
Oregon	16
South Dakota	16
Vermont	45
Virginia	62
Washington	56
Ophthalmia neonatorum:	
Missouri	1
New York	8
Paratyphoid fever:	
New York	7
Virginia	2
Washington	1
Puerperal septicemia:	
Montana	1
Rabies in animals:	
Massachusetts	16
Missouri	12
New York [1]	1
Oregon	2
Washington	3
Rabies (man):	
New York	1
Rocky Mountain spotted fever:	
Montana	5
Oregon	2
Virginia	13
Washington	1
Scabies:	
Oregon	4
Washington	1

July 1936—Continued

	Cases
Septic sore throat:	
Massachusetts	7
Missouri	22
New York	44
Oregon	2
Washington	3
Tetanus:	
New York	10
Trachoma:	
Arizona	30
Missouri	42
Montana	1
Trichinosis:	
New York	1
Tularemia:	
Virginia	3
Typhus fever:	
New York	3
Undulant fever:	
Arizona	8
Massachusetts	8
Missouri	2
Montana	1
New York	25
Oregon	1
South Dakota	1
Vermont	2
Virginia	1
Washington	2
Vincent's infection:	
New York [1]	36
Oregon	5
Whooping cough:	
Arizona	49
Massachusetts	467
Missouri	99
Montana	53
New York	1,201
Oregon	145
South Dakota	1
Vermont	34
Virginia	189
Washington	98

[1] Exclusive of New York City.

PLAGUE IN PRAIRIE DOGS IN GARFIELD COUNTY, UTAH

Under date of August 24, 1936, plague infection was reported in fleas taken from 23 prairie dogs, *Cynomys parvidens*, shot on a ranch 2 miles east of Hatch, Garfield County, Utah. Plague infection was reported, under date of August 26, 1936, to have been proved by mass inoculation of material from 2 prairie dogs shot August 6 on a ranch 5 miles northeast of Panguitch, Garfield County, Utah. See page 1279.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 22, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	1	0	0	0	0	3	15
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	10
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	0	6
Rutland	0	------	0	0	0	0	0	0	0	2	6
Massachusetts:											
Boston	1	------	0	8	5	13	0	10	0	63	187
Fall River	0	------	0	0	0	1	0	2	0	0	23
Springfield	0	------	0	0	0	1	0	1	0	8	32
Worcester	0	------	0	1	3	3	0	1	0	9	39
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	------
Providence	1	------	0	0	1	4	0	1	0	27	85
Connecticut:											
Bridgeport	0	------	0	4	0	1	0	1	0	2	21
Hartford	0	------	0	1	2	1	0	0	1	2	30
New Haven	0	------	0	0	1	1	0	0	0	13	23
New York:											
Buffalo	1	------	0	6	0	6	0	8	0	15	141
New York	16	2	1	41	64	18	0	106	12	135	1,284
Rochester	0	------	0	1	1	1	0	3	1	2	60
Syracuse	0	------	1	1	2	2	0	1	0	7	50
New Jersey:											
Camden	1	------	0	5	1	0	0	0	0	1	22
Newark	0	------	0	6	7	3	0	5	0	30	86
Trenton	1	------	0	0	2	2	0	1	3	3	31
Pennsylvania:											
Philadelphia	0	------	0	2	10	8	0	27	10	90	369
Pittsburgh	1	2	0	1	11	11	0	6	1	0	122
Reading	0	------	0	2	0	1	0	2	2	5	27
Ohio:											
Cincinnati	4	------	0	2	4	3	0	10	0	2	120
Cleveland	6	------	0	2	11	13	0	11	0	97	183
Columbus	1	------	0	1	2	2	0	4	0	17	70
Toledo	0	------	0	0	1	------	------	3	1	24	70
Indiana:											
Anderson	0	------	0	0	0	1	0	0	0	6	9
Fort Wayne	0	------	0	0	3	0	0	1	0	1	21
Indianapolis	1	------	1	3	7	4	0	3	1	3	107
South Bend	0	------	0	0	2	0	0	0	2	1	14
Terre Haute	0	------	0	0	0	0	0	0	0	0	25
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	7
Chicago	7	------	4	6	21	30	0	30	8	100	587
Elgin	2	------	0	0	0	0	0	0	0	5	10
Moline	0	------	0	0	0	0	0	1	1	1	5
Springfield	0	------	0	2	1	3	0	0	0	1	12
Michigan:											
Detroit	3	------	0	2	4	17	0	18	5	97	257
Flint	0	------	0	0	1	4	0	1	0	3	25
Grand Rapids	0	------	0	3	0	0	0	0	0	16	27
Wisconsin:											
Kenosha	0	------	0	0	0	1	0	0	0	0	6
Madison	0	------	0	0	0	0	0	0	0	16	3
Milwaukee	0	------	0	6	1	7	0	2	0	50	64
Racine	------	------	------	------	------	------	------	------	------	------	------
Superior	0	------	0	0	0	1	0	0	0	0	9
Minnesota:											
Duluth	0	------	0	0	8	0	6	0	0	8	23
Minneapolis	1	------	0	0	8	2	0	0	0	2	80
St. Paul	0	------	0	0	8	1	0	2	0	9	57
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	1	------
Davenport	1	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	------	0	1	0	0	------	0	0	23
Sioux City	0	------	------	0	------	0	0	------	0	0	------
Waterloo	0	------	------	0	------	1	0	------	0	3	------

City reports for week ended Aug. 22, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	0	-	1	0	4	2	0	3	0	2	120
St. Joseph	-	-	-	-	-	-	-	-	-	-	-
St. Louis	5	-	0	1	1	8	0	10	7	14	216
North Dakota:											
Fargo	0	-	0	0	0	3	0	0	0	0	7
Grand Forks	0	-	-	0	-	0	0	-	0	0	-
Minot	0	-	0	0	0	1	0	0	0	0	6
South Dakota:											
Aberdeen	0	-	-	0	-	0	0	-	0	0	-
Sioux Falls	0	-	0	0	0	2	0	0	0	0	7
Nebraska:											
Omaha	1	-	0	0	3	1	0	0	0	0	43
Kansas:											
Lawrence	0	-	0	0	1	0	0	0	0	0	12
Topeka	0	-	0	0	3	0	0	0	0	0	22
Wichita	0	-	0	1	1	1	0	1	1	1	20
Delaware:											
Wilmington	-	-	-	-	-	-	-	-	-	-	-
Maryland:											
Baltimore	4	-	0	8	10	6	0	6	0	100	176
Cumberland	0	-	-	0	0	0	0	-	0	0	-
Frederick	0	-	0	0	0	0	0	0	0	0	-
District of Columbia:											
Washington	2	-	0	3	3	2	0	6	3	25	147
Virginia:											
Lynchburg	2	-	0	0	0	0	0	0	2	4	11
Richmond	0	-	0	0	3	0	0	3	1	0	46
Roanoke	0	-	0	0	0	0	0	0	0	0	13
West Virginia:											
Charleston	0	-	0	1	1	0	0	0	0	0	14
Huntington	2	-	-	0	-	0	0	-	0	0	-
Wheeling	1	-	0	0	1	0	0	0	0	2	18
North Carolina:											
Gastonia	0	-	-	0	-	0	0	-	0	0	-
Raleigh	0	-	0	0	1	0	0	0	0	0	15
Wilmington	0	-	0	0	0	0	0	0	0	0	13
Winston-Salem	0	-	0	0	0	0	0	1	0	0	16
South Carolina:											
Charleston	1	-	0	0	0	0	0	1	0	0	21
Columbia	-	-	-	-	-	-	-	-	-	-	-
Florence	0	-	0	0	0	0	0	1	0	0	12
Greenville	0	-	0	0	1	0	0	0	0	0	5
Georgia:											
Atlanta	1	1	0	5	5	2	0	6	2	0	100
Brunswick	0	-	0	0	0	0	0	1	0	0	3
Savannah	3	-	0	0	0	0	0	1	2	0	30
Florida:											
Miami	0	-	0	1	1	0	0	0	0	0	21
Tampa	1	-	0	0	1	2	0	0	0	0	19
Kentucky:											
Ashland	0	-	-	0	1	0	0	-	0	0	16
Covington	0	-	0	0	0	0	0	1	0	0	1
Lexington	0	-	0	0	0	1	0	0	0	0	18
Louisville	1	-	0	-	3	1	0	3	2	1	83
Tennessee:											
Knoxville	2	-	0	0	2	0	0	0	0	0	20
Memphis	1	-	0	0	2	3	0	7	1	8	111
Nashville	3	-	0	0	4	0	0	3	2	-	60
Alabama:											
Birmingham	0	-	0	0	11	1	0	2	2	0	83
Mobile	1	-	0	0	1	0	0	1	0	0	12
Montgomery	0	-	-	0	-	0	0	-	1	0	-
Arkansas:											
Fort Smith	-	-	-	-	-	-	-	-	-	-	-
Little Rock	1	-	1	0	2	0	0	3	1	0	6
Louisiana:											
Lake Charles	0	-	0	0	0	0	0	1	0	0	6
New Orleans	1	2	3	2	7	0	0	10	7	6	138
Shreveport	0	-	0	0	7	0	0	2	0	0	48
Oklahoma:											
Oklahoma City	1	-	0	0	1	1	0	1	4	0	42
Tulsa	0	-	-	0	-	0	0	-	2	0	-

City reports for week ended Aug. 22, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	5	1	1	2	0	3	0	3	2	0	75
Fort Worth	1	------	0	0	3	1	0	1	0	0	47
Galveston	0	------	0	0	2	0	0	1	1	0	14
Houston	0	------	0	0	6	0	0	3	0	0	79
San Antonio	0	------	0	0	5	0	0	6	0	2	80
Montana:											
Billings	0	------	0	0	0	1	0	0	0	1	9
Great Falls	0	------	0	0	2	2	0	0	0	0	5
Helena	0	------	0	0	0	0	0	0	0	0	2
Missoula	0	------	0	0	0	0	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	0	0	0	1	0	0	9
Colorado:											
Colorado Springs	0	------	0	0	0	3	0	2	0	1	12
Denver	1	------	0	2	4	4	0	6	2	32	70
Pueblo	0	------	0	0	0	2	0	0	1	0	5
New Mexico:											
Albuquerque	0	------	0	0	0	0	0	4	0	0	11
Utah:											
Salt Lake City	0	------	0	1	0	2	1	0	0	8	23
Washington:											
Seattle	0	------	0	0	0	1	0	6	1	8	74
Spokane	0	------	0	------	2	6	0	0	0	0	19
Tacoma	0	------	0	0	1	0	0	2	0	0	20
Oregon:											
Portland	0	------	0	4	4	2	0	4	1	5	65
Salem	0	3	--------	0	-------	0	0	-------	0	0	--------
California:											
Los Angeles	0	7	1	18	12	4	0	16	0	36	266
Sacramento	0	------	0	0	1	7	0	1	0	23	15
San Francisco	2	------	2	3	8	5	0	4	0	19	146

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	0	1
New York:			
New York	3	0	1
Syracuse	0	0	1
New Jersey:			
Trenton	0	0	1
Pennsylvania:			
Pittsburgh	1	0	0
Ohio:			
Toledo	0	0	1
Indiana:			
Indianapolis	1	1	0
Illinois:			
Alton	0	0	1
Chicago	3	0	6
Michigan:			
Detroit	1	1	0
Grand Rapids	0	0	1
Wisconsin:			
Madison	1	0	0
Minnesota:			
Minneapolis	2	0	0
Iowa:			
Des Moines	1	0	0
Missouri:			
St. Louis	0	0	1
Maryland:			
Baltimore	1	1	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
District of Columbia:			
Washington	1	0	0
Virginia:			
Lynchburg	0	0	2
Kentucky:			
Ashland	0	1	0
Louisville	1	1	0
Tennessee:			
Memphis	2	0	2
Alabama:			
Birmingham	0	0	5
Mobile	0	0	1
Louisiana:			
New Orleans	1	0	1
Oklahoma:			
Oklahoma City	1	0	1
Texas:			
Dallas	0	0	2
Colorado:			
Denver	0	0	1
Washington:			
Spokane	0	0	2
Oregon:			
Portland	1	0	0
California:			
Los Angeles	1	0	1
San Francisco	0	1	0

Epidemic encephalitis.—Cases: New York, 1; Detroit, 2; Wichita, 1; Denver, 1.
Pellagra.—Cases: Atlanta, 3; Savannah, 1; Dallas, 1; Los Angeles, 1.
Typhus fever.—Cases: New York, 1; Atlanta, 4; Montgomery, 1.

FOREIGN AND INSULAR

BRITISH INDIA

Vital statistics—Fourth quarter, ended December 31, 1935. The following table shows the births and deaths reported in British India during the fourth quarter, ended December 31, 1935, together with the number of deaths reported from certain diseases.

Population	279,982,981
Births	2,818,217
Births per 1,000 population	40
Deaths	1,732,752
Deaths per 1,000 population	25

Deaths from:	
Cholera	42,015
Diarrhea and dysentery	70,288
Fevers	1,007,841
Plague	2,276
Respiratory diseases	123,027
Smallpox	9,502

CANADA

Manitoba—Bois Sevain—Poliomyelitis.—From July 25 to August 10, 1936, 25 new cases of poliomyelitis were reported in the Bois Sevain district, southwestern Manitoba, Canada. A previous report stated that up to July 24, 11 cases of poliomyelitis had been reported in the same district, making a total of 36 cases of poliomyelitis reported to August 10, 1936.

Provinces—Communicable diseases—2 weeks ended August 8, 1936.—During the 2 weeks ended August 8, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	1	1				3
Chicken pox		1	1	60	85	14	19	32	23	235
Diphtheria		7	22	44	8	9	1		1	92
Dysentery				1	10		1		1	13
Erysipelas				7	3	2		1	3	16
Influenza		20			5				5	30
Leprosy				1						1
Lethargic encephalitis						1				1
Measles		2	3	150	273	61	57	25	41	612
Mumps					125	4	10	4	30	173
Paratyphoid fever					2			1		3
Pneumonia	1				17				2	20
Poliomyelitis				3	3	17	2		2	27
Scarlet fever		7	5	88	136	55	9	50	6	356
Smallpox							1			1
Trachoma									2	2
Tuberculosis	4	43	40	111	53	52	27	2	23	364
Typhoid fever			5	35	12	2	16	2	1	73
Undulant fever				1	4					5
Whooping cough		8		196	229	16	12	10	48	519

YUGOSLAVIA

Communicable diseases—July 1936.—During the month of July 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	138	9	Poliomyelitis	32	5
Cerebrospinal meningitis	9	4	Scarlet fever	271	3
Diphtheria and croup	483	39	Sepsis	6	1
Dysentery	504	54	Tetanus	52	18
Erysipelas	213	13	Typhoid fever	556	38
Measles	145		Typhus fever	53	2
Paratyphoid fever	10	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for August 28, 1936, pages 1214–1227. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued September 25, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Algeria—Philippeville.—On August 22, 1936, 1 suspected case of plague was reported in Philippeville, Algeria.

Brazil—Santos.—Three cases of plague with 1 death during the week ended August 8, 1936, have been reported at Santos, Brazil. Two of these cases were published as occurring during the week ended August 15 in the PUBLIC HEALTH REPORTS of August 28, 1936, page 1217.

Tunisia—Tunis.—Two cases of plague, 1 case on August 21, and 1 case on August 26, 1936, have been reported in Tunis, Tunisia.

United States—Utah.—A report of plague-infection in Utah appears on page 1279 of this issue of PUBLIC HEALTH REPORTS.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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BRAIN REACTION IN GUINEA PIGS INFECTED WITH ENDEMIC TYPHUS, EPIDEMIC (EUROPEAN) TYPHUS, AND ROCKY MOUNTAIN SPOTTED FEVER, EASTERN AND WESTERN TYPES [1]

By R. D. LILLIE and R. E. DYER, *Surgeons, United States Public Health Service*

Since 1928 we have been interested in the presence of brain lesions in endemic typhus and the Rocky Mountain spotted fevers in guinea pigs, particularly in view of their reported absence or extreme scarcity in those diseases. About 1930 the problem of a possible differential diagnosis between endemic typhus and spotted fever on the basis of histologic examination of the brains of infected guinea pigs became of interest. It soon became apparent that, in spotted fever, focal lesions tended to occur with relatively greater frequency in the mid and hindbrain, whereas in typhus, cerebral cortical involvement was predominant. However, individual variations prevented accurate differential diagnosis on this relatively crude basis.

In the early stages of this work we adopted a series of five standard transverse sections of the guinea-pig brain for routine examination. The first passed through the frontal cortex and the corpora striata, in the neighborhood of the anterior commissure. The second included parietal and temporal cortex, hippocampus, and thalamus, at about the posterior margin of the internal capsule. The third passed through the oculomotor roots and the anterior colliculi. The fourth included pons, cerebellum, and brachia pontis. The last was made through the enlargement of the medulla.

As the problem of regional distribution became of diagnostic importance it became necessary to record the position as to major divisions of the brain, and the type of each individual focal lesion.

Some 700 such records have now accumulated and an analysis was undertaken in the hope that interesting facts might be revealed by a rough statistical study. This report is the presentation of the results of this analysis.

The brain lesions in typhus and in spotted fever in guinea pigs have been previously described, those of typhus many times. In spotted fever and endemic typhus the lesions were briefly described in our previous reports (1931). They consist of more or less compact nodes or clumps of glia cells, often situated adjacent to small vessels,

[1] From the National Institute of Health.

and of various vascular lesions. The glia cell nodes are usually composed of small cells with rounded or elongate (rod) nuclei and little evident cytoplasm, sometimes of large round cells of amoeboid glia or monocyte type compactly grouped. They lie in the brain substance, either gray or white, possibly more often in the gray. Not infrequently they occur in the molecular layer of the cerebral or cerebellar cortex. The vascular lesions consist of cellular infiltration of the vessel sheaths, usually by lymphocytes, of swelling and proliferation of adventitial fibroblasts, and of swelling and concentric proliferation of vascular endothelial cells. Thrombosis and endothelial necrosis are rarely seen. In endemic typhus 10 such lesions were noted in over 400 guinea-pig brains in which over 10,000 focal lesions were counted. In epidemic typhus 5 were found in 72 guinea-pig brains showing over 10,000 focal lesions. In the Bitterroot (western) strain of Rocky Mountain spotted fever 2 thrombi were found in 50 guinea-pig brains with 164 focal lesions, and in 160 guinea pigs infected with eastern strains of spotted fever 8 thrombi were found among 1,680 focal lesions.

The character of the individual lesions does not vary appreciably between the various types of typhus and spotted fever. No such characteristic lesion as the arteriolar thrombonecrosis with micro-infarcts seen in human spotted fever (Pinkerton and Maxcy 1931, Lillie 1931, Harris 1933) and probably in Malayan scrub typhus (Lewthwaite 1936) has been encountered in that disease in guinea pigs. However, important differences in topographic distribution of focal lesions in the various parts of the brain are found.

Similar focal nodal and vascular lesions have been repeatedly described in epidemic (European) typhus in guinea pigs (Grzywo-Dabrowski 1918, Pick in Otto and Dietrich's report 1918, Ceelen 1919, Doerr and Kirschner 1919, Wolbach, Todd, and Palfrey 1922, Hach 1925, Barikin, Kompanejez, Zacharoff, and Barikina 1927, and Tichomirov 1931); in Manchurian typhus by Kodama and Takahashi (1930), in tabardillo by Mooser (1928), in Sao Paulo typhus by Meyer in Gomes' report (1932), in Malayan shop typhus and scrub typhus by Lewthwaite and Savoor (1936), by the writers (Lillie 1931) in eastern and western strains of Rocky Mountain spotted fever and in endemic typhus (Dyer, Ceder, Lillie, Rumreich, and Badger 1931).

In epidemic typhus, these lesions have been numerous or variable (Wolbach et al.) in number; in tabardillo, Malayan shop typhus, endemic typhus, and apparently also in Manchurian typhus, they have been few. Focal lesions are also recorded as scarce in eastern and western strains of Rocky Mountain spotted fever, Sao Paulo typhus, and Malayan scrub typhus.

The meninges and the chorioid plexus of the several ventricles usually show more or less focal infiltration, usually by lymphocytes. In the pia this infiltration is often perivascular. Vascular endothelial swelling and proliferation occur as in the brain, and occasionally necrosis and thrombosis are seen. In view of the statements of Wolbach, Todd, and Palfrey, and of Hach that, in epidemic typhus in guinea pigs, lesions of the chorioid plexus are never found, the accompanying tabulation of the guinea pig brains in which chorioid plexus was studied is presented.

TABLE 1.—*Lesions of the chorioid plexus in epidemic and endemic typhus and eastern and western strains of Rocky Mountain spotted fever*

Disease	No lesions	Very slight infiltration	Slight reaction	Moderate reaction	Total guinea pigs
Epidemic typhus	11	5	7	11	31
Endemic typhus, male	41	73	122	36	272
Endemic typhus, female	1	2	7	2	15
Eastern spotted fever	17		25	19	61
Western spotted fever	1	3	7	9	23

This accords with the findings of Ceelen and of Lupu and Petrescu in epidemic typhus in man and with those reported by one of us (RDL) in human cases of the eastern type of Rocky Mountain spotted fever. Wolbach and coworkers failed to find plexal lesions in 37 human typhus cases.

When the general average of all the guinea-pig brains examined in each group is considered without reference to other factors, it is seen that in typhus over half of the focal lesions occur in the cerebral cortex (epidemic about 55 percent, endemic about 60 percent), about 16 to 21 percent (epidemic 21, endemic 16) in the thalamus and basal ganglia, and 25 to 26 percent in the midbrain, pons, medulla, and cerebellum. In the eastern type of Rocky Mountain spotted fever about 51 percent of the focal lesions occur in the midbrain, pons, cerebellum, and medulla, about 15 percent in the basal ganglia and thalamus, and only 32 percent in the cerebral cortex. The percentages for the Bitterroot strain of (western) spotted fever are cerebral cortex 52, basal ganglia and thalamus 11, and midbrain, pons, medulla, and cerebellum 37 percent. Here also a significantly high proportion of the lesions is found in the mid- and hind-brain, though less than with the eastern strains.

It is interesting to note (table 2) the relatively small number of focal lesions in the cerebellum in typhus and the preponderance of nodes over vascular lesions. In the cerebellum the greater part of the nodes occur in the molecular layer of the cortex; the vascular lesions, on the other hand, tend to be more frequent in the central nuclei and white substance. It seems also to be generally true that

TABLE 2.—*Detailed topographic distribution of various focal brain lesions in typhus and spotted fever in [illegible] guinea pigs*

	Endemic typhus (391 guinea pigs)										
	Cerebral cortex				Cerebral nuclei		Mid- and hindbrain				Total
	Frontal	Parietal	Temporal	Hippocampus	Corp. stri.	Thalamus	Midbrain	Pons	Medulla	Cerebellum	
Perivascular lymphocyte	1,083	734	222	520	571	509	262	259	215	76	4,451
Vascular proliferative	319	184	48	106	66	141	115	56	78	66	1,179
Total vascular	1,402	918	270	626	637	650	377	315	293	142	5,630
Glia "nodes"	1,002	854	328	485	171	410	378	288	280	324	4,517
Total focal lesions	2,404	1,772	598	1,111	808	1,060	755	603	573	468	10,147
	Western spotted fever (50 guinea pigs)										
Perivascular lymphocyte	18	8	6	2	5	5	7	5	13	3	72
Vascular proliferative	8	7	2	2	4	1	5	9	3	2	45
Total vascular	28	15	8	4	9	6	12	14	16	5	117
Glia "nodes"	10	14	5	1	0	3	6	1	6	1	47
Total focal lesions	38	29	13	5	9	9	18	15	22	6	164

	Epidemic (Europe[illegible])										
	Cerebral cortex				Cerebral nuclei		M[illegible]				Total
	Frontal	Parietal	Temporal	Hippocampus	Corp. stri.	Thalamus	Midbrain	Pons	Medulla	Cerebellum	
Perivascular lymphocyte	726	369	122	483	449	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vascular proliferative	209	180	27	85	65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total vascular	935	549	149	568	515	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glia "nodes"	1,004	851	203	474	250	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total focal lesions	1,939	1,400	352	1,042	795	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Eastern spotted fever ([illegible])										
Perivascular lymphocyte	74	20	7	33	53	34	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Vascular proliferative	41	35	5	21	20	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total vascular	115	55	12	54	73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Glia "nodes"	125	80	29	78	41	65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total focal lesions	240	135	41	132	114	132	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NOTE.—21 European typhus records excluded, 10 because this series was from a strain never surely identified, the others because of lack of det[illegible] lesions. Female guinea pigs and subcutaneously inoculated males excluded from the endemic typhus series (The endemic typhus series here includes [illegible] than is used in the other tabulation, as all the animals studied up to the time of completion of the paper are included here.)

the gray substance of the caudate nuclei contains relatively few glia "nodes" as compared with the number of vascular lesions, and that the frontal area of the cerebral cortex contains larger numbers of focal lesions, both nodal and vascular, than do the other portions of the cerebral cortex.

In epidemic typhus in guinea pigs focal lesions were recorded as most numerous in the floor of the fourth ventricle, hippocampus, and cerebral cortex by Pick (Otto and Dietrich, 1918), in the cerebral cortex by Wolbach, Todd, and Palfrey, in the brain stem and then cerebral cortex, hippocampus, medulla and cord by Hach (1925). Doerr and Kirschner found them throughout the brain, most numerous in the medulla. Ceelen (1919) noted a predilection of lesions for the cerebral cortex and medulla, and found rather numerous cerebellar foci in one guinea pig. Pick found no cerebellar lesions, Wolbach and coworkers found few, and Hach noted the cerebellum as containing the least lesions. In Manchurian typhus, Kodama and Takahashi (1930) found lesions most numerous in the posterior part of the cerebral cortex.

The proportion of the various types of focal lesions varies also. The nodal, focal glioses make up over half of the focal lesions in the endemic and epidemic typhus and in the eastern strains of spotted fever (59, 51, and 53 percent, respectively), whereas with the Bitterroot (western) strain only 29 percent of the lesions were classed as nodes. In both epidemic and endemic typhus over three-fourths of the vascular lesions are perivascular lymphocyte infiltrations of the vessel sheaths and the balance include endothelial and adventitial swelling, proliferation, and thrombosis. For endemic typhus the proportions are 32 percent perivascular lymphocyte infiltration to 9 percent proliferative lesions, and for epidemic typhus 39 percent perivascular lymphocyte infiltration to 10 percent proliferative lesions. In spotted fever, proliferative lesions make up one-third to one-half of the vascular lesions. For the eastern strains the proportions are 26 percent perivascular lymphocyte infiltration to 21 percent proliferative lesions, and for western strains 44 to 27 percent.

Probably the most important modifying factor in the pictures just described is the lapse of time. Time may be counted either from the date of inoculation or from the onset of fever to the date of death. The relative significance of these two modes of estimating the time factor depends obviously on whether or not the evolution of lesions proceeds at a relatively uniform rate during the incubation period.

Accordingly, the records of 280 guinea pigs infected with endemic typhus were distributed according to the length of the incubation period. This period varied from 1 to 18 days, according to the inoculum used.

As may be seen from table 3, there is no significant influence of the length of the incubation period on the number of brain lesions to be found in the standard series of sections. Consequently the logical mode of grouping appeared to be according to the time interval between onset of fever and death of the animal. When so grouped, these 280 guinea pigs showed low average numbers of lesions during the first 7 days of fever, a gradual rise on the eighth and ninth days, a peak period from the tenth to the thirteenth day, and a decrease thereafter (table 4).

TABLE 3.—*Influence of duration of incubation period on intensity of brain reaction in endemic typhus in 280 guinea pigs*

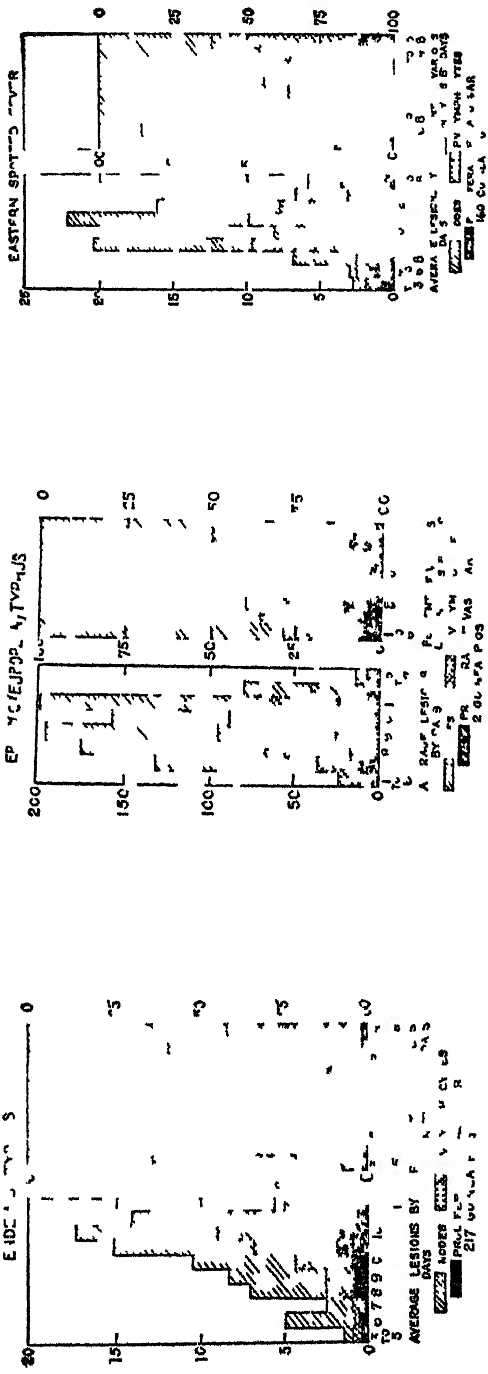
Days duration of incubation period	1	2	3	4	5	6	7	8	9	10	11	12	13–18	Mean, 5
Number of guinea pigs	8	7	66	26	45	45	15	37	9	13	7	4	3	Total, 280.
Average number of focal lesions	4.0	7.3	15.0	8.3	24.0	14.5	6.8	9.8	31.8	10.6	9.1	57.7	4.3	Average, 15.0.

TABLE 4.—*Influence of duration from onset of fever on intensity of brain reaction in endemic typhus in 280 guinea pigs*

Day from onset of fever	3	4	5	6	7	8	9	10	11	12	13	14–17	
Number of guinea pigs	3	1	6	9	27	43	33	60	49	18	17	14	Total, 280.
Average number of focal lesions	0.0	0.0	2.8	6.4	2.5	7.0	8.5	19.3	18.9	21.1	25.9	5.5	Average, 15.0.

As might be expected from the lack of significance of the length of incubation periods in regard to intensity of brain reaction, grouping of the same series of 280 guinea pigs by duration from date of inoculation to date of death shows a much prolonged period of relatively marked reactions, with a much lower average number of focal brain lesions during the peak period. As this mode of grouping appeared to be less significant than that according to duration from onset of fever, it was not used in the study of the other strains of typhus and spotted fever.

In epidemic typhus (Breinl strain) the number of lesions seen in the standard series of sections remained low during the first 6 days, rose sharply on the seventh and eighth days, remained high on the ninth to eleventh days, and fell sharply thereafter. A group of 72 guinea pigs was used for this classification. In the remaining animals studied (28) either the data or the sections were too incomplete for use. The average number of lesions was far higher than in endemic typhus strains, though some animals with endemic typhus showed more lesions than some with epidemic typhus.



Average number and percent ... of ... types of focal brain lesion in endemic and epidemic typhus ... of Rocky Mountain spotted fever in guinea pigs.

In eastern strains of Rocky Mountain spotted fever the first low period lasted to the sixth day, the rise occurred on the seventh and eighth days, the high or plateau period lasted from the ninth to the twelfth days and the number of lesions decreased from the thirteenth day on. The series charted for this study included 160 guinea pigs.

The small series of 50 guinea pigs infected with the western bitterroot strain of spotted fever showed a similar low number of lesions during the first week, a higher, though still small, number during the eighth to tenth days, and a fall in number of lesions in the few animals surviving the tenth day.

The relative paucity of focal brain lesions during the early stages of epidemic typhus in guinea pigs has been commented upon by Pick (Otto and Dietrich), who stated that the examination of several sections might be necessary to demonstrate them in the febrile period, and that later they became more numerous. Doerr and Kirschner found that focal brain lesions appeared in guinea pigs at about the time of onset of fever and persisted through the febrile period to as late as 11 days after defervescence. Hach also found focal brain lesions as early as the onset of fever and noted their increase in number up to the seventh day, a plateau period lasting to the third or fourth postfebrile day and a subsequent recession. Tichomirov's tabulation apparently shows a tendency to more marked reactions from the sixth to tenth day of fever, with fewer marked reactions before and after that period. Positive reactions were found as late as the fifth week. Wolbach, Todd, and Palfrey commented particularly on the presence of numerous brain lesions in a guinea pig killed on the eleventh or twelfth day from onset of fever. Barikin and coworkers also noted a greater frequency of nodes on the sixth to ninth days of fever, and appreciable numbers of "negative" brains before the sixth day and after the second postfebrile day.

In Manchurian typhus, Kodama and Takahashi found nodes most numerous on the third to seventh day of fever, and noted them as constantly present during the first 2 weeks if sufficiently exhaustive search was made.

In tabardillo, Mooser (1928) stated:

> In animals killed before the fourth day of fever only the early vascular lesions accompanied by meningeal and perivascular infiltration were found. After the fourth day the typical nodular lesion was present in all animals, but as a rule their number was so small that a whole brain had to be cut in serial sections in order to find them.

The time factor shows a similar influence on the proportion of guinea pigs in which a definite diagnosis of typhus or spotted fever on histologic grounds is possible. Animals showing no focal lesions in the standard series of sections were considered as negative, those with 1 to 2 lesions as inconclusive, those with 3 to 4 as probable, those

with 5 to 25 as positive (+), 26 to 50 (++), 51 to 100 (+++), and 101 or over (++++).

Among 10 guinea pigs killed on the third to fifth day of fever in endemic typhus, 1 showed a positive (+) reaction, and 9 inconclusive and negative reactions. On the sixth day there were 2 positive (+ and ++) and 7 negative or inconclusive reactions, on the seventh day 9 probable or positive and 19 negative or inconclusive; and the proportion thereafter rose during the peak period and fell late in the disease, as shown in table 5.

TABLE 5.—*Number of negative and inconclusive brain reactions and of positive reactions of varying grades in endemic typhus by day of disease*

Reaction	Day of disease										Total
	3–5	6	7	8	9	10	11	12	13	14–17	
− and ∓	9	7	19	28	11	22	11	8	5	8	128
± and +	1	1	9	11	19	25	22	5	7	6	106
++ to ++++	-	1		4	3	13	16	5	5		47
Total	10	9	28	43	33	60	49	18	17	14	281

The period in which approximately two-thirds of the animals show recognizable positive reactions (ninth to thirteenth day) corresponds fairly well with the period in which the average number of brain lesions is highest (tenth to thirteenth day).

In the eastern strains of spotted fever a similar influence was evident. Of 29 guinea pigs taken on the first to fourth days of fever, 21 showed negative or inconclusive reactions and 8 were positive. Of 28 taken on the fifth to eighth days, 14 were positive and 14 were negative or inconclusive. During the period ninth to twelfth day, in which the average number of brain lesions was highest, 65 of 82 guinea pigs showed definite brain reactions and only 17 were negative or inconclusive. Among 21 guinea pigs taken on the thirteenth to eighteenth days, 8 were negative and 13 positive.

In the western (Bitterroot) strain of spotted fever, 2 of 25 animals taken on the second to seventh days showed a positive reaction, 14 of 18 taken on the eighth to tenth days were positive, and 2 of 5 taken on the fourteenth to eighteenth days showed definite brain reactions. No animals were taken from the eleventh to thirteenth day.

Among the 72 guinea pigs infected with the Breinl strain of epidemic typhus only 7 showed negative or inconclusive brain reactions. These occurred in animals taken respectively on the second, eighth, eighth, tenth, tenth, thirteenth, and fourteenth days of fever, and are probably largely assignable to complications.

It has been stated that the reason brain reactions were slight or lacking in endemic typhus strains was that the testicular reaction localized the virus and protected the brain (Mooser, Pinkerton).

If this were true, male animals showing no testicular reaction after intraperitoneal inoculation, male animals inoculated by the subcutaneous route, and female guinea pigs should show more marked brain reactions than male guinea pigs showing scrotal redness and swelling after intraperitoneal inoculation.

In table 6, the brain reactions in 21 male guinea pigs not showing a scrotal reaction after intraperitoneal inoculation are compared individually with the averages of guinea pigs with scrotal reaction and killed on the same day of fever, with similar duration of fever. It is seen that there are more brain lesions in the group with the scrotal reactions.

TABLE 6.—*Endemic typhus: Brain reactions in intraperitoneally inoculated male guinea pigs in regard to presence or absence of scrotal redness and swelling*

Pathology no.	Scrotal redness and swelling absent					Scrotal redness and swelling present					
	Day of fever	Duration of fever	Brain reactions			Number of guinea pigs	Day of fever	Duration of fever	Brain reactions, averages		
			Nodes	Vascular lesions	Total focal lesions				Nodes	Vascular lesions	Total focal lesions
		Days						*Days*			
1207	5	1	0	0	0	2	5	3	1.0	0.0	1.0
8762	6	2	8	13	21	3	6	1-3	10.3	1.3	11.7
6188	7	6	3	8	11	19	7	5-7	1.4	.6	2.0
8343	7	5	3	2	5	7	7	5	3.1	1.6	4.7
5126	7	1	0	4	4	3	7	0-3	1.0	0	1.0
5127	7	6	5	1	6	19	7	5-7	1.4	.6	2.0
5581	8	8	0	0	0	9	8	8	.9	1.1	2.0
7830	9	9	2	0	2	8	9	9	1.2	.2	1.5
8900	9	2	4	0	4	6	9	0-4	6.7	5.5	12.2
8688	10	0	0	0	0	10	10	0-3	14.2	24.1	38.3
9038	10	10	0	0	0	10	10	10	5.5	6.1	11.6
9258	10	1	0	0	0	12	10	0-3	14.2	24.1	38.3
1470	11	6	1	0	1	14	11	5-7	18.1	24.9	43.0
4018	11	1	0	0	0	6	11	1-4	12.8	34.0	46.8
9026	11	2	5	23	28	6	11	1-4	12.8	34.0	46.8
9309	11	9	3	6	9	13	11	8-10	18.5	16.8	35.4
8460	13	13	0	0	0	2	13	12-13	0	0	0
9020	13	1	3	6	9	3	13	1-4	5.0	18.7	23.7
8406	14	2	6	2	8	4	13-16	1-4	4.0	14.0	18.0
5340	15	5	9	7	16	3	14-16	3-7	.3	0	.3
9301	17	17	0	0	0	5	14-16	14-16	2.6	2.8	5.4
Total, 21 guinea pigs			52	72	124				135.0	210.4	345.7
Average			2.5	3.4	5.9				6.4	10.0	16.5

Seventeen female guinea pigs were killed 14 days after inoculation in December 1935. These showed an average of 23 focal brain lesions. Eleven male guinea pigs with scrotal reactions, also killed 14 days after inoculation, and in December, to eliminate any seasonal influence, showed an average of 32.1 focal brain lesions. No "protection of the brain" by the testicular reaction was evident in this series.

Eleven male guinea pigs were killed 19 days after subcutaneous inoculation on the sixth to seventeenth days of fever. They showed an average of 2.8 focal brain lesions in the standard series of sections. When these animals are compared individually with the averages of

guinea pigs with scrotal reactions, killed on the corresponding days and showing a similar duration of fever (table 7), it is seen that animals inoculated subcutaneously also show less marked brain reactions than male guinea pigs inoculated intraperitoneally and showing scrotal reactions.

TABLE 7.—*Endemic typhus: Brain reactions in subcutaneously and intraperitoneally inoculated male guinea pigs*

Pathology no.	Subcutaneous inoculation (scrotal reactions absent)					Intraperitoneal inoculation (scrotal reactions present)					
	Day of fever	Duration of fever	Brain lesions			Number of guinea pigs	Day of fever	Duration of fever	Brain lesions, averages		
			Nodes	Vascular lesions	Total focal lesions				Nodes	Vascular lesions	Total focal lesions
		Days						*Days*			
9107	6	6	0	2	2	4	6	6	0.0	0.5	0.5
9103	9	5	5	5	10	7	9	5	4.7	3.6	8.3
9104	9	2	0	2	2	2	9	2	2.0	.5	2.5
9110	9	1	0	7	7	3	9	0 2	3.7	.3	4.0
9111	9	2	8	8	6	2	9	2	2.0	.5	2.5
9105	10	8	0	0	0	6	10	3	15.7	23.1	38.8
9108	10	9	0	0	0	19	10	5 10	3.9	3.6	7.6
9112	10	2	1	2	3	12	10	1 3	11.1	23.9	38.1
9100	13	6	0	0	0	5	13	5–7	21.6	26.8	48.4
9102	17	10	0	0	0	4	11 17	7-11	4.7	4.0	8.7
9106	17	13	1	0	1	7	14-17	11 15	4.6	4.3	8.9
Total, 11 guinea pigs			10	21	31				77.0	91.1	168.8
Average			0.9	1.9	2.8				7.0	8.8	15.8

It would appear from the foregoing data that the presence of a testicular and scrotal reaction is not the factor which determines the relative scarcity of brain lesions in endemic typhus as compared with epidemic typhus.

However, the small series of guinea pigs infected with epidemic typhus which developed a testicular reaction did show brain reactions comparable with those of endemic typhus in number of lesions, and much reduced in comparison with other animals not showing scrotal involvement. Ten guinea pigs with scrotal reactions taken on the ninth to thirteenth days of the disease showed an average of 33.6 lesions, while 11 guinea pigs infected with epidemic typhus and not showing scrotal involvement, taken on the eighth to twelfth days, in the same year, 1930, showed an average of 279 lesions.

This series, occurring in the course of routine transfers of the Breinl strain of epidemic typhus in February and March 1930, gave scrotal reactions typical of endemic typhus, which was transferrable by testicular washings and was carried through several passages and then lost, never reverting to typical epidemic typhus. It appears probable that this group of guinea pigs may have been infected with an endemic strain through some laboratory accident.

The concept that the presence of a testicular reaction prevented the appearance of focal brain lesions originated with Mooser, who (1928) noted that the one female guinea pig inoculated with tunica emulsion showed the most numerous nodules in the brain of his series of animals, and in the discussion of his paper on rickettsiae in Mexican typhus presented before the American Association of Pathologists and Bacteriologists in 1928 he stated that the scrotal swelling was probably responsible for the rarity of brain lesions—"The testicle protects the brain from being involved." Mooser's series was apparently too small to give him a true concept of the great variation in number of brain lesions possible in male guinea pigs inoculated intraperitoneally with the same material. Zinsser and Castañeda make the bare statement that the characteristic brain lesions are present in subcutaneously inoculated guinea pigs without scrotal reaction.

Pinkerton (1931) noted that brain lesions were practically absent in intraperitoneally inoculated male guinea pigs infected with the Wilmington strain of endemic typhus or with Mooser's strain of tabardillo, when the characteristic scrotal sac reaction had occurred. In female guinea pigs and in subcutaneously inoculated males, brain lesions were usually fairly easily found, though not as numerous as in the Wolbach and Breinl strains of epidemic typhus. In one series of six males inoculated subcutaneously with a small amount of scrotal sac exudate from the Wilmington strain, brain lesions were fully as numerous as in the epidemic strains.

Pinkerton further states: "In order to obtain numerous brain lesions in the American strains it would seem that we must prevent the occurrence of a severe local reaction."

It was found that in endemic typhus in guinea pigs the brain reaction was influenced by the clinical course of the disease. On the average, greater numbers of lesions were found in animals showing the typical picture of uncomplicated clinical typhus than in those showing complications or mild clinical reactions.

Of 5 guinea pigs showing febrile complication without clinically diagnosable typhus, 4 showed no brain lesions and 1 showed 11—an average of 2.2. Typical typhus followed by late complications gave an average of 3.5 lesions in 59 guinea pigs. Early febrile complications followed by typical typhus reactions gave an average of 4.6 lesions in 14 animals. Uncomplicated "mild" typhus reactions gave an average of 11.4 lesions in 22 guinea pigs. Typical uncomplicated clinical typhus with the usual scrotal reaction gave an average of 19.3 lesions in 180 guinea pigs. The maximum number of lesions for an individual animal was for typical typhus 220* for "mild" typhus 79, for early complications 39, for late complications 63, and

* We have since seen 3 brains with counts of 229, 275, and 238.—Authors.

for masked complicated typhus 11. The influence of the lack of scrotal reaction in intraperitoneally inoculated males discussed above is probably of the same nature as that involved in the association of "mild" or atypical clinical reaction with a less marked brain reaction. It should be noted, however, that brain reaction may occur in the absence of a febrile reaction. Among 5 such guinea pigs, 3 showed no focal lesions, 1 showed 3 focal lesions (1 node and 2 vascular), and 1 showed a total of 7 nodes, giving an average for the group of 2.0 lesions.

Both Hach and Tichomirov have noted in epidemic typhus in guinea pigs that severe clinical reactions were associated with the most marked brain lesions and mild clinical reactions with slight histologic changes in the brain. Hach extended this correlation to strains of typhus virus, some showing severe clinical reactions and extensive brain lesions, with others showing mild clinical reactions and less extensive brain lesions. However, Hach has noted the presence of brain lesions in animals with slight or no febrile reactions.

In man, Grzywo-Dabrowski was unable to determine any relationship between the duration of epidemic typhus and the number and character of brain lesions.

Cultures of the heart blood were made at autopsy in 219 guinea pigs infected with endemic typhus in which histologic examination of the brain was done. Positive cultures were obtained in 30, killed on the sixth to the sixteenth days. These showed an average of 7.1 brain lesions in the standard series, while in 189 guinea pigs in which the heart blood culture was sterile the average number of brain lesions was 11.2.

The type of inoculum used was also found to influence the intensity of the brain reaction in endemic typhus. This was manifested both in a higher proportion of brains showing diagnostic lesions and in a higher average number of focal lesions with the one inoculum, testicular washings, than with the other, blood.

In table 8 the total percentages of negative, positive, and marked reactions for all time periods are misleading, because of the higher proportion of the testicular washing group killed in the 3- to 8-day period. The really significant figures are found in the 9- to 13-day period, both in percentages of positive reactions and in average number of lesions.

In tabardillo, Mooser (1928) found very few "nodes" in the brains of guinea pigs infected with blood, but found them fairly numerous in those inoculated with an emulsion of tunica vaginalis. Later (1929) he recorded the presence of focal brain lesions in 5 of 10 guinea pigs inoculated with blood, 7 of 10 inoculated with brain showed very few lesions, and all of 10 inoculated with tunica emulsion showed lesions, which were also more numerous.

TABLE 8.—*Comparison of average intensity and proportion of diagnosable positive brain reactions in endemic typhus according to inoculum used*

REACTIONS FROM TESTICULAR WASHINGS INOCULUM

Day of fever	Negative		Positive		Marked		Total number of animal	Average number of lesions
	Number	Percent	Number	Percent	Number	Percent		
3 to 8	40	70	13	23	4	7	57	5.3
9 to 13	23	27	38	46	22	27	82	27.8
14 to 17	7	64	1	36	0	0	11	5.6
Total	69	46	55	37	26	17	150	17.5

REACTIONS FROM BLOOD INOCULUM

Day of fever	Negative		Positive		Marked		Total number of animal	Average number of lesions
	Number	Percent	Number	Percent	Number	Percent		
3 to 8	22	69	9	28	1	3	32	5.0
9 to 13	29	35	35	43	18	23	82	21.8
14 to 17	1	50	1	50	0	0	2	5.5
Total	52	45	45	39	19	16	116	15.4

CONCLUSIONS

1. The character of the individual focal brain lesions in guinea pigs is not notably different in endemic and epidemic typhus and in eastern and western strains of Rocky Mountain spotted fever.

2. A notably higher proportion of the focal lesions is found in the midbrain, pons, medulla, and cerebellum in Rocky Mountain spotted fever, especially in the eastern strains, then in either of the typhus fevers.

3. Proliferative types make up a higher proportion of the vascular lesions in spotted fever than in typhus.

4. The length of the incubation period has no discernible influence on the intensity of the brain reaction in endemic typhus.

5. All the typhus and spotted fever strains studied show an early period of relatively low intensity of reaction in the first week, a period of rapid rise in number of lesions, about 2 days, a "plateau" period of maximum brain reaction lasting 3 to 4 days in the second week, and a late subsidence period. In typhus, perivascular lymphocyte infiltration is relatively more frequent in the "plateau" period of maximum reaction, "nodes" and proliferative vascular lesions earlier and later. The frequency of recognizable brain reactions in endemic typhus and the spotted fevers is also greatest in the "plateau" period.

6. The presence of a scrotal and testicular reaction in endemic typhus does not decrease the intensity of the brain reaction, but rather the reverse.

7. Clinically mild or complicated endemic typhus shows a less intense brain reaction than uncomplicated typhus with definite scrotal reaction.

8. The presence of cultivable microorganisms in the heart blood at autopsy is associated with a lowered intensity of the brain reaction.

9. The use of testicular washings as an inoculum in endemic typhus gives a greater frequency and intensity of brain reactions during the 9 to 13-day period than does blood.

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TIME CHANGES IN THE RELATIVE MORTALITY FROM ACCIDENTAL BURNS AMONG CHILDREN IN DIFFERENT GEOGRAPHIC REGIONS OF THE UNITED STATES, 1925-32 [1]

Studies on the Fatal Accidents of Childhood No. 3

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Data pertaining to fatalities from different accidents among children under 15 years of age published in a recent paper (*1*) showed that for the death registration area of 1930 accidental burns (conflagration excepted) was the leading cause of death at ages 1, 2, and 3 years, and for the age group under 5 years, the deaths per 100,000 children being 22, 20, 18, and 17, respectively. The total number of deaths from burns among children under 5 years of age was 1,876, which is approximately one-third more than the number of deaths suffered by children in the same age group from automobile accidents.

Because of the importance of this accidental cause of death among children, and particularly among children of preschool age, it is purposed in this paper to study certain time changes in the mortality from accidental burns among children of different geographic regions of the United States. As in the previous papers (*1, 2*) the mortality data are specific for the single years of age under 5, and for the age groups 5 to 9 and 10 to 14 years; and, as in the paper immediately preceding, the time period extends from 1925 through 1932. Comparable figures are available in published volumes of the Bureau of the Census; and in the absence of accurate annual population enumerations, the mortality is measured in terms of relative mortality, namely, in terms of the ratio of the number of fatalities from burns to the number of fatalities from all accidents.

The third and fourth revisions of 1920 and 1929 of the "Manual of the International List of Causes of Death" include under the title, "Accidental burns (conflagration excepted)", the following: Burn (conflagration excepted, of any organ or part), by boiling liquid, boiling water, coal oil, corrosive substance, fall with lighted lamp, fire, gasoline, kerosene, molten metal, petroleum, steam, sulphuric acid, and vitriol; Dermatitis actinica and ambustionis; Effects of corrosives, radium, and X-ray; Explosion of gasoline, kerosene, and lamp; Fall into fire; Fire (conflagration excepted); Lamp accident; Playing with fire; Scald of any part of body by steam; and Sunburn.

For the purpose of this inquiry, the death registration States of 1925, consisting of 40 States and the District of Columbia, are divided into 4 broad groups each comprising a geographic region as indicated: A Northeastern (Connecticut, Delaware, Maine, Maryland,

[1] From the Office of Child Hygiene Investigations, U. S. Public Health Service.

Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and District of Columbia), a North Central (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, West Virginia, and Wisconsin), a Southeastern (Alabama, Florida, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia), and a Western (California, Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming).

TABLE 1.—*Number of deaths from accidental burns (conflagration excepted) per 100 deaths from all accidents among children under 15 years of age in different geographic regions of the United States, 1925–32, white and colored combined*

NORTHEASTERN

Year	A								
	All ages	Under 1	1	2			Under 5		10 to 14
1925	20.0	10.7	38.4	42.6	39.7	31.6	31.8	13.6	
1926	19.5	11.5	38.4	42.4	36.8	30.9	31.2	11.9	
1927	19.0	12.2	39.9	41.3	32.6	31.5	31.4	11.9	
1928	17.5	12.7	38.3	41.1	31.4	28.1	29.9	11.6	
1929	16.3	13.5	30.9	30.5	32.0	23.3	26.8	11.7	
1930	11.5	10.1	32.9	26.4	21.9	18.1	21.2	7.2	
1931	10.6	8.7	28.0	26.1	17.1	16.1	19.0	6.4	
1932	10.1	10.4	20.4	20.0	16.6	13.8	18.7	6.7	
NORTH CENTRAL									
1925	16.0	7.8	27.8	38.3	28.7	26.9	21.6	10.6	4.8
1926	16.1	7.2	30.1	33.3	31.2	25.9	24.1	11.2	5.7
1927	15.4	6.9	26.2	33.1	29.7	25.5	23.4	10.3	5.0
1928	15.1	6.3	26.3	31.0	27.6	23.5	21.8	10.7	6.7
1929	14.7	10.7	26.3	27.9	30.0	21.8	22.9	10.0	4.5
1930	10.0	5.5	21.1	22.5	18.6	17.8	16.5	6.9	3.1
1931	9.8	5.8	21.4	21.8	18.1	13.3	16.4	6.1	3.6
1932	11.2	7.6	25.2	27.9	19.4	18.5	19.5	6.6	3.6
1925	27.0	11.5	33.6	47.5	52.7	46.6	35.0	26.3	10.1
1926	28.9	14.5	37.5	17.3	56.6	44.8	36.2	27.7	10.3
1927	25.1	15.1	32.1	39.9	17.3	42.6	32.3	23.0	9.3
1928	24.3	11.7	31.3	47.3	39.9	41.4	31.0	23.7	7.7
1929	23.0	11.5	32.9	40.8	30.9	39.3	30.1	21.2	8.4
1930	18.6	11.3	28.9	32.4	32.9	32.2	25.4	16.6	6.8
1931	17.5	13.2	27.9	35.7	32.7	27.0	25.8	14.3	5.4
1932	18.0	12.6	33.2	35.5	30.6	30.7	27.7	15.7	5.3
WESTERN									
1925	13.8	7.2	21.5	28.2	27.6	18.5	19.8	10.8	4.3
1926	11.8	9.0	14.1	33.3	20.3	14.8	17.3	8.0	6.1
1927	12.3	8.8	14.6	24.1	11.6	21.8	16.3	10.3	6.3
1928	11.2	6.7	19.1	17.0	23.5	21.1	17.0	8.1	4.3
1929	12.2	7.0	17.3	26.0	23.3	17.6	17.4	9.9	4.4
1930	9.0	5.6	19.1	15.8	14.7	11.0	12.9	6.4	5.1
1931	7.9	7.0	13.4	14.7	13.2	16.1	12.5	5.2	3.7
1932	8.6	3.5	16.0	19.6	14.1	19.2	13.6	5.5	3.2

TABLE 1-A.—*Number of deaths from accidental burns (conflagration excepted) among children under 15 years of age in different geographic regions of the United States, by age, 1925–32, white and colored combined*

NORTHEASTERN

Year	Age in years: All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	1,200	66	214	204	215	177	876	277	47
1926	1,131	71	201	203	193	161	837	231	63
1927	1,019	59	175	200	173	156	703	233	53
1928	968	63	172	161	140	133	698	221	49
1929	850	64	126	122	141	138	591	209	50
1930	772	53	134	130	121	102	540	182	50
1931	715	41	129	131	102	103	506	161	48
1932	598	42	109	100	84	76	420	145	33

NORTH CENTRAL

Year	All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	926	55	174	188	143	121	681	181	64
1926	898	56	173	161	153	101	644	182	72
1927	865	48	156	162	140	124	630	171	64
1928	827	42	159	138	131	102	572	169	86
1929	816	72	153	134	135	99	593	165	58
1930	721	41	132	129	104	94	502	165	54
1931	660	37	131	131	92	72	463	135	62
1932	663	43	111	129	80	78	483	123	57

SOUTHEASTERN

Year	All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	1,024	98	132	172	187	137	724	225	75
1926	1,110	98	163	183	193	137	772	259	70
1927	921	91	149	130	178	121	638	215	71
1928	891	76	137	159	125	115	612	220	59
1929	801	62	123	133	121	105	543	194	64
1930	776	69	109	117	120	96	511	200	65
1931	694	69	109	121	100	78	477	164	53
1932	710	67	114	110	117	85	493	166	51

WESTERN

Year	All ages	Under 1	1	2	3	4	Under 5	5 to 9	10 to 14
1925	215	14	46	44	32	22	158	42	15
1926	184	17	28	41	26	12	124	37	23
1927	204	17	27	42	20	26	132	48	24
1928	184	11	33	25	32	24	125	42	17
1929	191	13	35	40	24	21	133	41	17
1930	176	12	33	20	23	15	112	39	25
1931	162	15	27	23	23	22	110	32	20
1932	157	7	34	28	24	20	113	29	15

Table 1, which presents the essential data of the study, gives for 1925-32 the geographic distribution of the number of deaths from accidental burns per 100 deaths from all accidents, together with the number of deaths from accidental burns, for children under 15 years of age, white and colored combined. The table immediately discloses that the number of deaths from accidental burns has been decreasing in each region during the 8 years under observation. In general, however, the percentage age distribution varies but little from year to year as among the different regions. For example, a calculation shows that for each region during 1925–32 approximately 70 percent of all deaths from accidental burns occurring annually among children under 15 years of age were suffered by children under

5 years of age. Similar percentages for ages 1, 2, 3, and 4 are 18, 18, 15, and 13, respectively.

RELATIVE MORTALITY BY AGE, SPECIFIC FOR REGION

Figure 1 shows the time changes by age in the relative mortality from accidental burns for the different geographic regions from 1925 through 1932. It will be observed that the magnitudes of the lower and upper limits of the distribution of the relative mortalities regardless of age vary from region to region. In each region the lower limit is given by the age group 10 to 14 and the upper limit by the children of age 2, save the Southeastern region, where this limit is given by the 3-year-olds. When the ranges of relative mortality are placed in order of decreasing magnitude, the regions with their ranges read as follows: Southeastern (51.3), Northeastern (40.4), North Central (35.2), and Western (30.1). The lower limits of the ranges are of a similar order of magnitude, being in the neighborhood of 3 percent. The upper limits, on the other hand, read 56.6, 42.6, 38.3, and 33.3, with the regions in the same order as given immediately above. These upper limits indicate that, in the Southeastern region, accidental burns accounted for more than one-half of the deaths from fatal accidents in 1926 at 3 years of age; in the Northeastern region the proportion in 1925 was nearly one-half, but at 2 years of age; in the North Central region the proportion in 1925 was more than one-third and at 2 years of age, and in the Western region the proportion in 1926 was one-third at 2 years of age.

The curves (fig. 1) for the four regions are similar in three respects. First, the trends of relative mortality, while with different rates of change, are decreasing at each age and for each age group. Second, the curve of relative mortality for all ages definitely separates all of the age curves in each region into two similar sets: The first set, which lies below the curve for all ages, consists of the curves for ages under 1 and the age groups 5 to 9 and 10 to 14; the second set, which lies above the curve for all ages, consists of the curves for ages 1, 2, 3, and 4. Thus, in each region during the 8 years 1925-32, the trend of the relative mortality from burns decreased at each age and for each age group. And during the same period, furthermore, in each region the relative mortality of ages 1, 2, 3, and 4 was consistently greater than the relative mortality for all ages; at under 1 year of age and for the age groups 5 to 9 and 10 to 14, on the other hand, the relative mortality was consistently less than that for all ages. The third point of similarity deals with the absence of order of the curves within the sets referred to above: The relative mortality at ages 1, 2, 3, and 4 in each region is such that it does not permit a definite ordering of the mortality with respect to these ages; with respect to the set comprising ages under 1 year and the age groups 5 to 9 and 10 to 14,

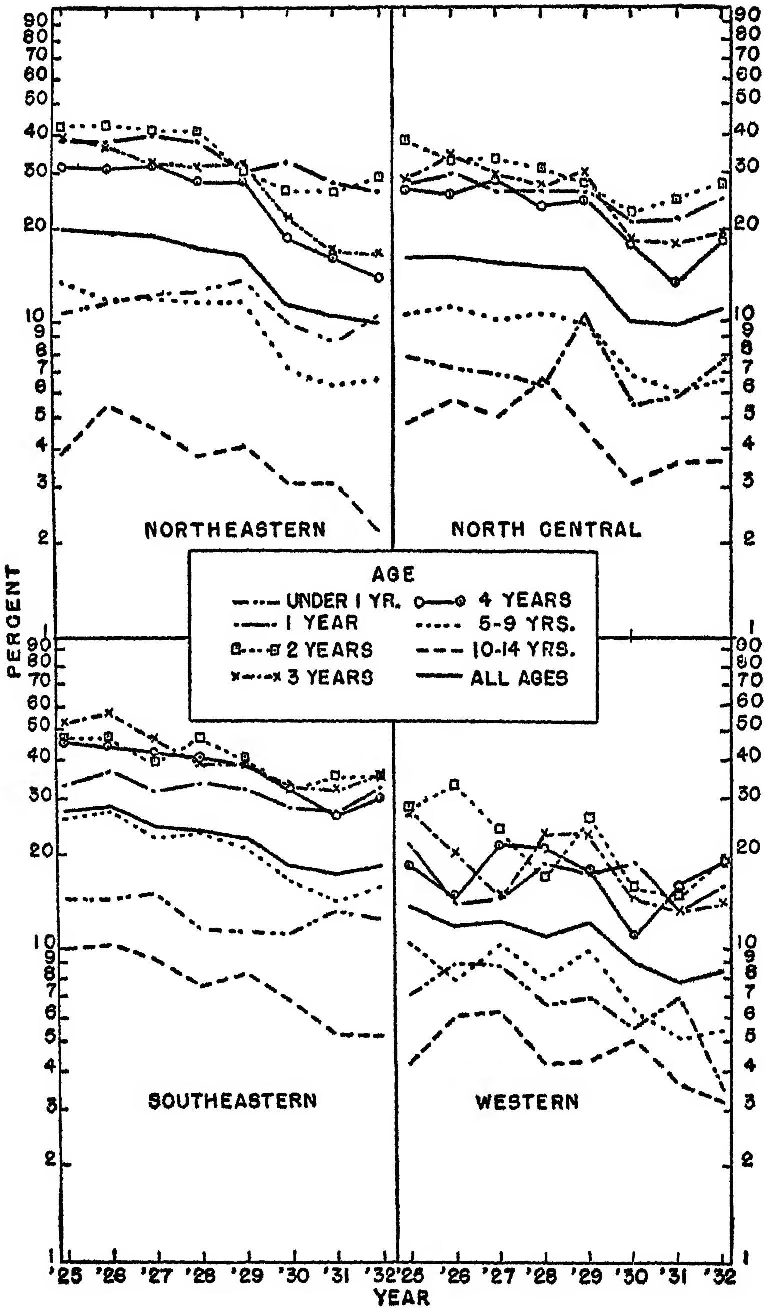

FIGURE 1.—Number of deaths from accidental burns (conflagration excepted) per 100 deaths from all accidents, by age, in different geographic regions, 1925–32, white and colored combined. (Logarithmic scale.)

the situation is only slightly different in that the mortality for the latter age group is generally the lowest in each of the regions.

With regard to the order of the ages in each region, for the period 1925–32, with respect to the magnitude of the rate of decline of relative mortality, measured by the slopes of the straight lines fitted to the appropriate curves of figure 1, the following facts emerge:

In all regions ages 2, 3, and 4 show the most rapid decline. As previously indicated, it was the children of these particular ages who suffered almost one-half of the burden of the mortality from burns among children under 15 years of age. When the rates of decrease for these ages are ordered by region according to decreasing magnitude, the Northeastern and the Southeastern regions show the same order. The first, second, and third places are occupied by the 3-, 4-, and 2-year-olds, respectively. For the Northeastern region the rates of decrease in percent are 28, 21, and 19; for the Southeastern, 25, 23, and 17. The corresponding percents for the North Central and Western regions are, respectively, 11, 15, and 17, and 8, 7, and 15. The remaining ages of the corresponding regions show lower percents, with no striking similarity of order as among the regions.

RELATIVE MORTALITY BY REGION, SPECIFIC FOR AGE

In figure 2 the curves of relative mortality for the period 1925–32 have been rearranged to show how the four regions compare when age is held constant. While the regions are not similarly ordered at each age, attention must be directed to certain other observable facts relating to order.

For all ages, ages 5 to 9 and 10 to 14, and at ages 3 and 4, the Southeastern region consistently shows the highest relative mortality. This is directly opposed to an earlier finding which disclosed that this region had the lowest relative mortality from automobile accidents at each age (2). For all ages and the age group 5 to 9, and at ages 2, 3, and 4 the regions tend to order themselves with respect to decreasing order of relative mortality thus: Southeastern, Northeastern, North Central, and Western. At ages under 1, both the Northeastern and Southeastern regions show a higher relative mortality than either the North Central or Western. At age 1 both the Northeastern and Southeastern are followed by the North Central and Western, respectively. For the age group 10 to 14 the Southeastern is high, with the remaining regions all lower and in no definite order.

With regard to the order of the regions at each age with respect to the magnitude of the rate of decline of relative mortality, measured as indicated in the previous section, figure 2 shows the following:

The largest rate of decrease among the various curves appears to be at age 3 for the Northeastern (28 percent) and Southeastern (25 percent) regions; at the same age the rates for the North Central

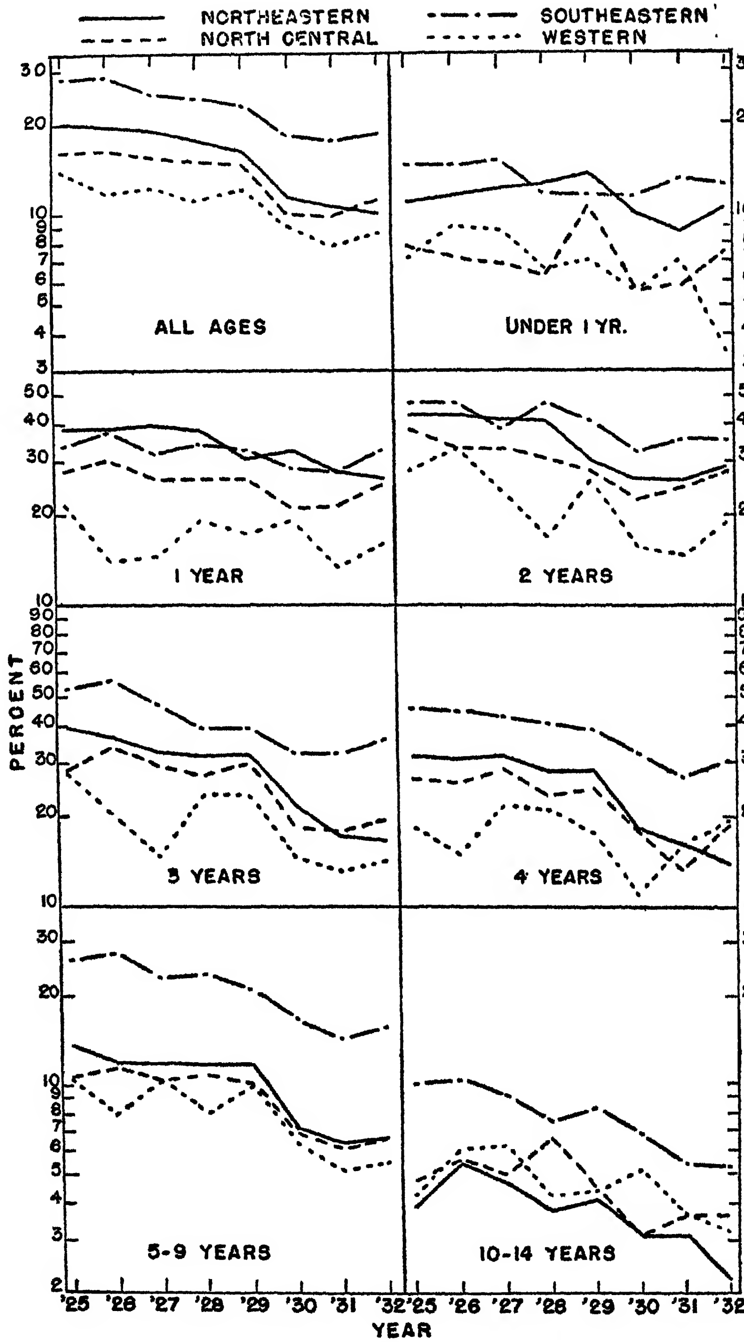

FIGURE 2.—Number of deaths from accidental burns (conflagration excepted) per 100 deaths from all accidents, by geographic region, at different ages, 1925-32, white and colored combined. (Logarithmic scale.)

and Western regions are 11 and 8, respectively; and for all ages, while the rates of decrease for the corresponding regions are lower, the order of the regions is similar. At ages under 1 the rate of decline for all regions is in the neighborhood of 3 percent, while at age 2 the decline for all regions is approximately 17 percent. At age 1 the Northeastern region is highest, with a rate of 16 percent followed by the North Central (9 percent), Southeastern (8 percent), and the Western (1 percent). At age 4 the Northeastern and Southeastern regions lead with a rate of about 20 percent, followed by the North Central (15 percent) and Western (7 percent). The age groups 5 to 9 and 10 to 14 show similar orders, the Southeastern leading with 16 and 7 percent, respectively, and the other regions approximating 7 and 3 percent.

SUMMARY

This paper deals with time changes in the relative mortality from accidental burns (conflagration excepted) among children under 15 years of age in different geographic regions of the United States from 1925 through 1932. Relative mortality is defined as the ratio of the number of fatalities from accidental burns to the number of fatalities from all accidents.

The death registration States of 1925, consisting of 40 States and the District of Columbia, are divided into 4 broad groups, each constituting a geographic region: A Northeastern, a North Central, a Southeastern, and a Western.

The actual number of deaths from accidental burns decreased in each region during the 8 years observed. The percentage age distribution of the deaths, however, varied from year to year but little as among the different regions.

Relative mortality by age, specific for region.- In each region the lower limit of relative mortality, approximately 3 percent, is given by the age group 10 to 14 years and the upper limit by the children of age 2, save the Southeastern region, where this limit is at 3 years. The upper limits for the Southeastern, Northeastern, North Central, and Western regions are 57, 43, 38, and 33 percent, respectively. The trends of relative mortality for all regions, while with different rates of change, decrease for each age and age group. In all regions ages 2, 3, and 4 show the most rapid decline. The other ages of the corresponding regions show lower rates.

Relative mortality by region, specific for age.—The regions are not similarly ordered at each age. For all ages and the age group 5 to 9 years, and at ages 2, 3, and 4 the regions tend to order themselves with respect to decreasing relative mortality, thus: Southeastern, Northeastern, North Central, and Western. With respect to the rate of decline of relative mortality, the largest rate appears to be

at age 3 for the Northeastern (28 percent) and the Southeastern (25 percent) regions; at the same age the rates for the North Central and Western regions are 11 and 8, respectively.

REFERENCES

(1) Gafafer, W. M.: (1936) Mortality from automobile accidents among children in different geographic regions of the United States, 1930. Studies on the fatal accidents of childhood no. 1. Pub. Health Rep., 51: 1083–1090 (Aug. 7, 1936).

(2) Idem.: (1936) Time changes in the relative mortality from automobile accidents among children in different geographic regions of the United States, 1925–1932. Studies on the fatal accidents of childhood no. 2. Ibid., 51: 1186–1194 (Aug. 28, 1936).

DEATHS DURING WEEK ENDED AUG. 29, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 29, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,345	6,691
Deaths per 1,000 population, annual basis	10.3	9.3
Deaths under 1 year of age	500	511
Deaths under 1 year of age per 1,000 estimated live births	46	48
Deaths per 1,000 population, annual basis, first 35 weeks of year	12.5	11.6
Data from industrial insurance companies:		
Policies in force	68,313,576	67,554,445
Number of death claims	11,009	10,059
Death claims per 1,000 policies in force, annual rate	8.4	8.2
Death claims per 1,000 policies, first 35 weeks of year, annual rate	10.2	10.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Sept. 5, 1936, and Sept. 7, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 5, 1936, and Sept. 7, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935
New England States								
Maine	1	1			3	8	0	0
New Hampshire							0	0
Vermont					2	4	0	0
Massachusetts	3	2			21	13	1	1
Rhode Island		1				2	0	0
Connecticut		3	3		6	1	0	1
Middle Atlantic States								
New York	15	24	14	13	68	41	5	5
New Jersey	3	11	4	4	8	12	3	2
Pennsylvania	27	21			17	20	2	3
East North Central States								
Ohio	4	15	2	1	5	19	0	7
Indiana	6	12	7	30	10	3	2	2
Illinois	20	12	3	6	2	16	3	6
Michigan	9	7			13	21	8	2
Wisconsin	4	1	2	11	8	30	1	1
West North Central States								
Minnesota	5	7			4	4	1	2
Iowa	5	12		1	3	4	0	0
Missouri	13	23	8	13	2	4	1	2
North Dakota	2					5	0	0
South Dakota		1			10		0	1
Nebraska	6	2			1	1	0	0
Kansas	7	5	1		2	5	0	0
South Atlantic States								
Delaware [2]		2				1	0	0
Maryland [1]		1	2	1	13	4	0	4
District of Columbia	9	13	1		1		0	3
Virginia [2]	15	20			8	4	3	2
West Virginia	6	20	5	30	1	6	0	1
North Carolina	38	28	2	4	7	6	0	4
South Carolina [4]	4	20	50	91	2	1	1	0
Georgia [4]	11	26					1	0
Florida [4]	8	7		2		2	1	0

See footnotes at end of table

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 5, 1936, and Sept. 7, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935
East South Central States:								
Kentucky	12	63	5	3	17	3	2	0
Tennessee	17	22	6	29	5	1	7	3
Alabama[4]	21	31	6	27		7	0	1
Mississippi[4]	19	26					0	1
West South Central States:								
Arkansas	9	35	2	7		4	1	2
Louisiana	10	24	11	14		7	1	0
Oklahoma[5]	8	19	8	12	18	1	0	1
Texas[4]	28	76	31	16	8	1	2	0
Mountain States:								
Montana	1	1	4			8	0	0
Idaho	1				1		0	0
Wyoming[3]					1	3	0	0
Colorado	5	7			3	1	5	1
New Mexico	2		1		3	1	2	0
Arizona	2	2	11	6	1	1	1	0
Utah[3]					1	1	2	0
Pacific States:								
Washington	1		2		4	13	1	1
Oregon			10	5	4	32	0	0
California	30	28	13	18	18	73	3	8
Total	387	679	211	316	339	418	65	62
First 36 weeks of year	16,189	19,777	112,331	105,025	271,308	695,312	6,123	4,854

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935
New England States:								
Maine	1	17	4	11	0	0	0	3
New Hampshire	0	3	3	8	0	0	0	0
Vermont	0	4	3	1	0	0	0	4
Massachusetts	1	109	38	32	0	0	5	7
Rhode Island	0	81	6	3	0	0	6	0
Connecticut	1	38	7	8	0	0	2	1
Middle Atlantic States:								
New York	20	414	88	108	0	1	30	35
New Jersey	1	72	11	25	0	0	27	15
Pennsylvania	5	9	76	52	0	0	38	16
East North Central States:								
Ohio	2	2	52	111	0	0	15	54
Indiana	1	8	14	43	0	0	8	18
Illinois	30	22	81	130	3	0	25	47
Michigan	5	76	40	31	0	0	10	16
Wisconsin	1	4	46	59	1	0	2	6
West North Central States:								
Minnesota	0	5	12	31	0	0	2	5
Iowa	3	5	16	18	4	0	1	7
Missouri	2	3	13	54	0	0	47	20
North Dakota	0	0	5	2	2	1	2	1
South Dakota	2	0	13	10	0	0	1	1
Nebraska	1	0	3	9	0	6	0	1
Kansas	0	1	17	17	0	1	11	17
South Atlantic States:								
Delaware[1]	0	0		4	0	0	1	1
Maryland[3]	1	11	15	18	0	0	11	16
District of Columbia	0	5	6	10	0	0	0	4
Virginia[2]	4	16	17	19	0	0	15	41
West Virginia	3	3	12	45	0	0	10	16
North Carolina	1	11	27	36	0	1	25	16
South Carolina[4]	0	1	3	7	0	0	4	24
Georgia[4]	5	0	1	9	0	0	21	10
Florida[4]	2	0	4	4	0	0	5	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 5, 1936, and Sept. 7, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935	Week ended Sept. 5, 1936	Week ended Sept. 7, 1935
East South Central States:								
Kentucky	4	42	27	57	0	0	52	96
Tennessee	22	3	21	27	0	1	25	50
Alabama [4]	5	2	13	4	0	0	12	15
Mississippi [1]	18	0	8	9	0	0	16	13
West South Central States:								
Arkansas	1	0	3	8	0	0	20	7
Louisiana	3	2	3	3	0	0	33	25
Oklahoma [5]	0	1	8	13	0	1	26	21
Texas [4]	1	8	24	21	0	1	27	70
Mountain States:								
Montana	1	1	16	9	3	2	7	8
Idaho	0	0	4	4	0	1	5	4
Wyoming [3]	0	0	9	6	5	0	0	2
Colorado	2	1	6	21	0	0	6	5
New Mexico	2	0	5	5	0	0	20	2
Arizona	0	1	1	2	0	0	0	5
Utah [4]	0	1	2	14	0	0	1	0
Pacific States:								
Washington	7	1	9	8	8	18	2	1
Oregon	0	0	11	11	2	3	5	5
California	25	21	64	75	0	2	16	15
Total	183	1,007	805	1,210	28	39	606	753
First 36 weeks of year	1,517	6,421	186,465	183,421	6,345	5,107	8,687	11,171

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Sept. 5, 1936, 2 cases, as follows: Delaware, 1; Virginia, 1.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended Sept. 5, 1936, 44 cases, as follows: South Carolina, 1; Georgia, 18; Florida, 3; Alabama, 16; Texas, 6.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1936										
California	25	126	2,134	15	8,031	12	19	1,264	7	51
July 1936										
Florida	13	13	5	62	19	7	1	11	0	4
August 1936										
Connecticut	4	3	2		43		3	23	0	8
Delaware					3		1	8	0	3
District of Columbia	6	20			22	1	1	9	0	5
Florida	7	11	2	93	14	4	7	13	0	6
Maine		7	8		111		8	80	0	12
Pennsylvania	18	69		4	212	2	17	317	0	109

Summary of Monthly Reports from States—Continued

	Cases
May 1936	
California:	
Actinomycosis	3
Chicken pox	2,090
Dysentery (amoebic)	11
Dysentery (bacillary)	11
Food poisoning	49
German measles	1,581
Granuloma, coccidioidal	4
Hookworm disease	2
Leprosy	1
Mumps	2,581
Ophthalmia neonatorum	2
Paratyphoid fever	3
Rabies in animals	71
Rocky Mountain spotted fever	1
Septic sore throat	15
Tetanus	7
Trachoma	296
Trichinosis	2
Tularaemia	3
Undulant fever	14
Whooping cough	1,777
July 1936	
Florida:	
Chickenpox	1
Dysentery	2
Mumps	24
Paratyphoid fever	1
Typhus fever	16
***July 1936*—Continued**	
Florida—Continued.	
Undulant fever	1
Whooping cough	41
August 1936	
Anthrax:	
Pennsylvania	1
Chickenpox:	
Connecticut	44
Delaware	6
District of Columbia	2
Florida	3
Maine	27
Pennsylvania	191
Dengue:	
Florida	3
Dysentery:	
Connecticut (bacillary)	8
Florida	2
Pennsylvania (bacillary)	1
Epidemic encephalitis:	
District of Columbia	1
Pennsylvania	6
German measles:	
Connecticut	21
Maine	6
Pennsylvania	16
Mumps:	
Connecticut	80
Delaware	6
Florida	10
Maine	140
Pennsylvania	233
***August 1936*—Continued**	
Ophthalmia neonatorum:	
Connecticut	1
Pennsylvania	1
Paratyphoid fever:	
Florida	1
Rabies in animals:	
Connecticut	2
Maine	1
Rocky Mountain spotted fever:	
Delaware	2
District of Columbia	8
Septic sore throat:	
Connecticut	5
Tetanus:	
Connecticut	1
Pennsylvania	1
Typhus fever:	
Florida	11
Undulant fever:	
Connecticut	6
Delaware	1
Maine	1
Pennsylvania	20
Vincent's infection:	
Maine	12
Whooping cough:	
Connecticut	312
Delaware	29
District of Columbia	125
Florida	21
Maine	67
Pennsylvania	1,881

RODENT PLAGUE IN MODOC COUNTY, CALIF.

The Director of Public Health of California reported under date of June 15, 1936, that plague infection had been proved, by animal inoculation, in four ground squirrels received at the laboratory on June 11 from localities 4 miles east, and 5 miles east and 1 mile north of Hackamore, in Modoc National Forest, Modoc County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 29, 1936

This table summarizes the reports received weekly from a selected list of 121 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine											
Portland	0	--	0	0	0	0	0	0	0	8	14
New Hampshire											
Concord	0		0	0	0	0	0	0	0	0	8
Manchester	0		0	0	0	0	0	0	0	0	17
Nashua	0			0	-	0	0		0	0	--
Vermont											
Barre											--
Burlington	0		0	0	0	1	0	0	0	2	12
Rutland	0		0	0	0	1	0	0	0	0	4
Massachusetts											
Boston	0		0	0	10	9	0	5	0	53	183
Fall River	0		0	0	1	1	0	2	0	1	22
Springfield	0		0	0	0	2	0	0	0	0	23
Worcester	0		0	0	1	2	0	3	0	8	40
Rhode Island											
Pawtucket	0		0	0	0	0	0	0	0	0	-
Providence	0		0	0	0	0	0	4	0	14	34
Connecticut											
Bridgeport	0		1	1	1	0	0	1	0	12	28
Hartford	1		0	0	0	1	0	1	1	0	25
New Haven	0	1	0	0	0	0	0	0	1	73	27
New York											
Buffalo	0		0	1	5	1	0	4	0	0	93
New York	8		3	44	5	24	0	70	16	107	1,175
Rochester	0		0	0	1	0	0	0	0	2	56
Syracuse	0		0	0	0	3	0	1	0	22	16
New Jersey											
Camden	2		0	0	2	0	0	1	1	0	35
Newark	0		0	0	1	2	0	9	0	27	90
Trenton	0		0	0	2	2	0	3	0	4	31
Pennsylvania											
Philadelphia	1		2	7	23	14	0	24	11	97	384
Pittsburgh	1		1	1	15	9	0	11	1	38	146
Reading	0		0	1	0	0	0	1	0	13	43
Scranton	0			0		0	0		0	0	-
Ohio											
Cincinnati	4		0	3	8	3	0	10	3	1	164
Cleveland	1	3	1	[illegible]	8	16	0	17	0	74	181
Columbus	3		0	3	1	4	0	2	0	6	70
Toledo	0		0	0	1	4	0	1	0	12	68
Indiana											
Anderson	0		0	2	1	1	0	0	0	0	8
Fort Wayne	0		0	0	1	0	0	0	0	0	22
Indianapolis	0		2	1	7	1	0	4	2	1	107
South Bend	0		0	0	1	0	0	0	0	2	14
Terre Haute	0		0	0	0	1	0	0	0	0	22
Illinois											
Alton	0		0	0	0	1	0	0	1	0	7
Chicago	12		0	5	19	26	0	35	0	86	657
Elgin	1		0	0	1	0	0	0	0	2	8
Moline	0		0	0	0	0	0	0	0	5	5
Springfield	0		0	0	1	2	0	1	1	1	23
Michigan											
Detroit	2		0	3	5	10	0	17	0	88	222
Flint	0		0	0	1	1	0	0	0	5	26
Grand Rapids	0		0	0	0	1	0	0	0	4	18
Wisconsin											
Kenosha	0		0	0	1	1	0	0	0	0	6
Madison	0		0	0	0	2	0	1	0	2	18
Milwaukee	0		0	1	2	6	0	3	1	51	76
Racine	0		0	1	0	0	0	0	0	0	10
Superior	0		0	0	0	0	0	0	0	0	13
Minnesota											
Duluth	0	-	0	1	0	0	0	1	0	4	18
Minneapolis	0		0	0	2	5	0	1	0	4	94
St. Paul	0		0	1	1	5	0	8	0	14	47

City reports for week ended Aug. 29, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0			0		1	0		0	0	---
Davenport	0			0		0	0		0	0	
Des Moines	0			0	---	1	0		0	0	20
Sioux City	0		---	1		1	2		0	1	
Waterloo	1	---	---	0	---	0	0		0	2	
Missouri:											
Kansas City	0	---	0	0	0	6	0	4	0	0	122
St. Joseph	---	---	---	---	---						---
St. Louis	8	---	0	0	4	2	0	6	1	13	262
North Dakota:											
Fargo	0	---	0	1	0	0	0	0	0	0	11
Grand Forks	0	---	---	0	---	0	0	---	0	0	---
Minot	0	---	0	0	0	0	0	0	0	0	6
South Dakota:											
Aberdeen	0			0	---	0	0	---	0	0	---
Sioux Falls	0	---	0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	5	---	0	0	5	0	0	2	0	8	59
Kansas:											
Lawrence	0	---	0	0	0	0	0	0	0	0	2
Topeka	---	---	---	---	---	---	---	---	---	---	---
Wichita	0	---	0	0	2	0	0	0	0	0	32
Delaware:											
Wilmington	0	---	0	0	4	0	0	1	0	1	28
Maryland:											
Baltimore	2	---	0	5	15	4	0	8	0	108	192
Cumberland	0	---	0	0	0	1	0	0	0	0	11
Frederick	0	---	0	0	1	0	0	0	0	0	5
District of Col.:											
Washington	0	---	0	4	6	0	0	8	0	18	161
Virginia:											
Lynchburg	0	---	0	0	0	0	0	0	2	4	17
Norfolk	2	---	0	2	2	4	0	8	0	0	30
Richmond	1	---	0	0	8	1	0	2	0	0	41
Roanoke	1	---	0	0	0	0	0	1	0	0	11
West Virginia:											
Charleston	0	---	0	0	1	0	0	0	2	0	19
Huntington	1	---	---	0	---	0	0	---	1	0	---
Wheeling	0	---	0	0	1	0	0	2	0	8	20
North Carolina:											
Gastonia	0	---	0	0	0	0	0	0	0	0	---
Raleigh	0	---	0	0	1	0	0	0	1	0	18
Wilmington	1	---	0	0	1	1	0	1	0	0	11
Winston-Salem	2	1	0	0	2	0	0	1	0	1	17
South Carolina:											
Charleston	0	---	0	0	0	0	0	1	2	0	21
Columbia	---	---	---	---	---	---	---	---	---	---	---
Florence	0	---	0	0	0	0	0	1	0	0	9
Greenville	0	---	0	4	0	0	0	0	0	0	4
Georgia:											
Atlanta	0	---	0	2	5	5	0	5	1	0	70
Brunswick	0	---	0	0	1	0	0	0	0	0	3
Savannah	3	---	0	0	0	0	0	3	3	3	33
Florida:											
Miami	0	1	1	0	1	2	0	0	0	0	21
Tampa	1	---	0	1	1	1	0	0	0	0	19
Kentucky:											
Ashland	0	---	---	0	---	0	0	---	1	0	---
Covington	0	---	0	0	4	0	0	0	0	0	10
Lexington	0	---	0	0	3	0	0	2	0	0	25
Louisville	2	---	0	0	3	1	0	2	0	13	41
Tennessee:											
Knoxville	3	---	0	1	0	2	0	2	3	0	32
Memphis	1	---	0	0	2	1	0	6	0	2	95
Nashville	1	---	0	0	2	0	0	3	3	0	67
Alabama:											
Birmingham	1	---	0	0	3	1	0	4	4	0	58
Mobile	2	---	0	0	3	0	0	2	0	0	30
Montgomery	2	---	---	0	---	0	0	---	1	0	---
Arkansas:											
Fort Smith	---	---	---	---	---	---	---	---	---	---	---
Little Rock	0	---	0	0	6	1	0	3	0	0	13
Louisiana:											
Lake Charles	0	---	0	0	2	0	0	0	0	2	5
New Orleans	6	3	1	0	8	1	0	7	1	1	139
Shreveport	1	---	0	0	4	1	0	2	3	1	30

City reports for week ended Aug. [illegible], 1938—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oklahoma:											
Oklahoma City	0	2	0	0	1	1	0	1	3	0	42
Texas:											
Dallas	3		0	2	4	5	0	0	1	4	69
Fort Worth	0		0	0	3	0	0	3	2	0	36
Galveston	0		0	0	3	0	0	2	0	0	21
Houston	0		1	0	2	2	0	5	3	0	91
San Antonio	2		0	0	4	0	0	8	0	0	68
Montana:											
Billings	0		0	0	1	0	0	1	0	0	12
Great Falls	0		0	0	1	0	0	0	1	0	8
Helena	0		0	0	0	0	0	0	0	0	2
Missoula	0		0	0	0	0	3	0	1	0	12
Idaho:											
Boise	0		0	0	1	2	0	0	0	0	7
Colorado:											
Colorado Springs	0		0	1	0	0	1	2	0	0	10
Denver	1		1	0	8	2	0	6	0	31	66
Pueblo	0		0	0	1	0	0	0	0	1	10
New Mexico:											
Albuquerque	0		0	0	0	1	0	2	1	0	14
Utah:											
Salt Lake City	0		0	1	3	6	0	1	0	5	37
Nevada:											
Reno											-
Washington:											
Seattle											-
Spokane	0		0	1	0	3	0	0	0	2	21
Tacoma	0		0	0	2	0	0	0	0	0	25
Oregon:											
Portland	0		0	0	1	8	0	1	0	13	62
California:											
Los Angeles	8	10	0	6	7	7	0	18	3	37	[illegible]
Sacramento	0		0	0	1	6	0	0	2	7	28
San Francisco	2	1	0	1	[illegible]	12	0	[illegible]	0	10	155

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:			
Boston	0	1	2
New York:			
Buffalo	0	0	1
New York	6	2	0
Pennsylvania:			
Philadelphia	[illegible]	0	0
Pittsburgh	1	1	1
Indiana:			
Indianapolis	1	1	0
Illinois:			
Chicago	1	1	7
Michigan:			
Detroit	1	0	2
Iowa:			
Des Moines	1	0	1
Missouri:			
St. Louis	1	1	0
Maryland:			
Baltimore	2	1	0
District of Columbia:			
Washington	1	1	1
Virginia:			
Lynchburg	0	0	1
Georgia:			
Atlanta	1	0	0
Florida:			
Tampa	1	0	0
Tennessee:			
Memphis	2	1	0
Nashville	0	0	2
Alabama:			
Birmingham	0	0	1
Montgomery	0	0	1
Louisiana:			
New Orleans	1	0	0
Shreveport	0	2	1
Texas:			
Dallas	0	0	1
Montana:			
Billings	0	1	0
Colorado:			
Denver	0	0	1
Washington:			
Spokane	0	0	1
California:			
Los Angeles	0	1	2
Sacramento	1	0	0

Epidemic encephalitis.—Cases: Washington, 1; Birmingham, 1; Denver, 3.

Pellagra.—Cases: Washington, 1; Savannah, 1; Dallas, 1; New Orleans, 3; Los Angeles, 3.

Typhus fever.—Cases: Moline, 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 2; Birmingham, 1; Mobile, 1; Montgomery, 2; New Orleans, 3.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended August 22, 1936.—During the 2 weeks ended August 22, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					1				1	2
Chicken pox		2	6	41	71	5	11	12	22	173
Diphtheria		6	8	27	11	8	8			58
Dysentery				1	1				1	3
Erysipelas				4	2	3			3	12
Influenza		1			18				5	24
Measles		1		52	74	41	28	8	83	240
Mumps			1		63	3	5	5	28	105
Paratyphoid fever					5					5
Pneumonia	5	2			2		2		4	15
Poliomyelitis				6	12	32	2	1	2	55
Scarlet fever		7	5	66	93	[illegible]	27	85	14	300
Smallpox								1		1
Trachoma									5	5
Tuberculosis	2	87	25	79	96	6	1	1	23	270
Typhoid fever			10	47	18	3	7	2		85
Undulant fever					5	1		2		8
Whooping cough		12		171	167	2	4	5	20	390

CUBA

Habana—Communicable diseases—4 weeks ended August 29, 1936.—During the 4 weeks ended August 29, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	16		Poliomyelitis	[1] 9	1
Dysentery (bacillary)	36	3	Tuberculosis	14	1
Malaria	[1] 120	2	Typhoid fever	[1] 70	18

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended August 22, 1936.—During the 4 weeks ended August 22, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camagüey	Oriente	Total
Cancer	1	2		2		[illegible]	11
Chicken pox				1		1	2
Diphtheria				5		1	6
Hookworm disease						1	1
Leprosy		2		1			3
Malaria	[illegible]	102	4	394	221	677	1,626
Measles					8	4	12
Poliomyelitis		3	1				4
Scarlet fever			1				1
Tuberculosis	12	19	7	35	37	34	144
Typhoid fever	22	68	38	42	31	30	251

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for August 28, 1936, pages 1214-1227. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued September 25, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Algeria—Oran.—On September 1, 1936, 1 suspected case of plague was reported at Oran, Algeria.

France—Marseille.—On August 30, 1936, 1 case of plague in a dock laborer was reported in Marseille, France. A report dated September 3, 1936, stated that 2 plague-infected rats were also reported in Marseille.

Hawaii Territory—Hawaii Island—Hamakua District—Paauhau Sector.—Two rats found on August 27, 1936, and 1 rat found on August 28, 1936, in Paauhau Sector, Hamakua District, Hawaii Island, Hawaii Territory, have been proved plague infected.

United States—California.—A report of plague-infected ground squirrels in Modoc County, Calif., appears on page 1320 of this issue of PUBLIC HEALTH REPORTS.

Yellow Fever

Nigeria—Kano.—On August 21, 1936, 1 suspected fatal case of yellow fever was reported in Kano, Nigeria.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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PUBLIC HEALTH REPORTS

VOL. 51 SEPTEMBER 25, 1936 NO. 39

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

August 9 September 5, 1936

Poliomyelitis.—Poliomyelitis still continued above normal in the East South Central region; for the 4 weeks ended September 5, Tennessee reported 85 cases; Alabama, 64; Mississippi, 54; and Kentucky, 22. Other regions reported about the normal seasonal increase that might be expected. In preceding years the summer rise of poliomyelitis has usually reached its peak during this period.

The total number of cases reported for the country as a whole was 626. In 1935 there were 3,625 cases reported for this period and in 1934 the number of cases totaled 1,251. In 1935 an epidemic that began in South Carolina and spread into other States along the Atlantic coast reached its peak during this period, as did also an epidemic in 1934 that began in California and extended into other western States. In 1933 a minor epidemic was in progress at this time in the North Atlantic States and a total of 1,413 cases was reported, while a more severe epidemic in those same regions in 1931 was mostly responsible for a total of approximately 5,000 cases during this period. In 1932 the number of reported cases totaled 986, the highest incidence occurring in States along the Atlantic coast.

Meningococcus meningitis.—The reported incidence of meningococcus meningitis for the current period was 220 cases, a decline of about 25 percent from the preceding 4-week period. The incidence was below that for the corresponding period in 1935, when 268 cases were reported. For this period in 1934, 1933, and 1932 the numbers of cases totaled 129, 129, and 160, respectively. The South Central and Mountain and Pacific regions reported slight increases over last year, but in all other regions the disease was less prevalent during the current period than last year.

Typhoid fever.—The number of cases of typhoid fever reported for the current 4-week period was 2,355, the lowest incidence recorded

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the eight important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State Health officers. The number of States included for the various diseases are as follows: Typhoid fever, 48, poliomyelitis, 48, meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48, scarlet fever, 48, influenza, 41 States and New York City. The District of Columbia is counted as a State in these reports.

for this period in the 8 years for which these data are available. All regions except the Middle Atlantic reported a decrease from last year's figures. In the East North Central, South Atlantic, and South Central regions the incidence was the lowest in recent years, while in other regions it fell slightly below the average for several preceding years. Pennsylvania, with 117 cases as compared with 81 last year, and New Jersey, with 59 as compared with 37, seemed mostly responsible for a more than 20 percent increase over last year in the Middle Atlantic region.

Scarlet fever.—The incidence of scarlet fever continued to decline. The number of cases (3,472) reported for the 4 weeks ended September 5 represented more than 15 percent decrease from the average incidence for this period in the 5 preceding years. In the North Atlantic and North Central regions the incidence was about normal, while in the South Atlantic and South Central regions it was the lowest for this period in recent years. In the Mountain and Pacific regions the number of cases was about 15 percent below that for last year, but in both years the incidence was somewhat above the seasonal expectancy.

Measles.—The usual seasonal decline of measles continued through the 4 weeks ended September 5. The number of cases (1,861) was about 15 percent below the average incidence for the relatively normal measles years of 1929–33, inclusive. For this period in 1935 and 1934 the number of cases totaled 2,909 and 3,135, respectively.

Influenza.—For the current 4-week period 834 cases of influenza were reported, as compared with 1,257, 1,515, and 1,301 for the corresponding period in the years 1935, 1934, and 1933, respectively. The situation was very favorable in all sections of the country.

Diphtheria.—The comparison of current reports of diphtheria with those for previous years continued to be favorable. The number of cases reported for the 4 weeks ended September 5 was 1,393, as compared with 2,058, 1,975, and 2,692 for the corresponding period in the years 1935, 1934, and 1933, respectively. In the Mountain and Pacific regions the incidence closely approximated that of last year, while in all other regions it was considerably below that of last year. For the country as a whole the current incidence was the lowest in the 8 years for which these data are available.

Smallpox.—For the country as a whole the incidence of smallpox still continued to be the highest in recent years. The reported cases for the current period total 141 as against 117, 70, and 83 for the corresponding period in the 3 preceding years, regressively. The incidence was still confined to the North Central and Mountain and Pacific regions. Of the total number of cases, Montana reported 58, Minnesota, 11; Wyoming, 10; Washington and Iowa, 9 each. No cases were reported from States along the Atlantic coast and only 2 from the South Central regions.

Mortality, all causes.—The average mortality rate from all causes in large cities for the 4 weeks ended September 5, as reported by the Bureau of the Census, was 10.1 per 1,000 inhabitants (annual basis). The rates for the corresponding period in 1935, 1934, and 1933 were 9.6, 9.7, and 9.3, respectively.

The higher death rates during the first 3 weeks of the period, 10.2, 10.3, and 10.3, were apparently due to the heat. During this period, cities in the South Central regions and those in the southern part of the East North Central region showed the largest excesses in mortality; during the more severe heat wave of the preceding 4-week period cities in the northern part of North Central regions were most affected. For a few cities the rates during the current period were more than double those of last year, and in a very considerable number they were as much as 50 percent above those of last year. During the last week of the period the rate dropped to 9.6, which was about normal.

ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

XIII. METHYL FORMATE[1]

By H. H. Schrenk,[2] W. P. Yant,[3] John Chornyak,[4] and F. A. Patty[5]

This report on the acute response of guinea pigs to methyl formate vapor is the thirteenth of a series of similar reports (*1*) which deal with studies pertinent to establishing a criterion of the toxicity of some chemical products which have recently become commercially available for industrial application.

The investigation of methyl formate was undertaken at the request of the General Electric Co. and was conducted jointly with the United States Bureau of Mines at its Pittsburgh Experiment Station.

SCOPE OF WORK

The scope of the work included a study of the toxicity and physiological response of guinea pigs exposed to vapors of methyl formate. Only acute effects as produced by a single exposure were studied. The experiments were planned to cover a range of concentrations

[1] Contribution from the Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa. Published by permission of the Director, U. S. Bureau of Mines. Work completed on manuscript September 23, 1935.

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[3] Supervising chemist, health laboratory section, and supervising engineer, Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa.

[4] Medical officer in charge, pathological laboratory, health laboratory section, Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa.

[5] Associate chemist, health laboratory section, Pittsburgh Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa.

which would produce but slight or no response, moderate response and serious response.

The methyl formate used was bought under specifications for refrigeration use, which required 95 percent to distill between 31.5° and 32.2°C., and the remainder between 32.2° and 33.5° C. Methyl formate, $HCOOCH_3$, is a colorless liquid with an ethereal odor. The boiling point of the pure compound is 31.8° C.; the specific gravity is 0.975, 20°/4° C.; and vapor pressure 476.4 mm of mercury at 20° C.

USE OF METHYL FORMATE

Methyl formate is used in fumigants. It has also been considered for use as a high boiling refrigerant for household appliances. The extent of its present use for these purposes is not known to the authors.

TEST APPARATUS

The apparatus for preparing methyl formate vapor-air mixtures which were within or near the inflammable range was the same as that described in a previous report on ethylene dichloride (*1*), except that the constant flow of liquid methyl formate was obtained with a floating siphon similar to that described by Sullivan (*2*). For concentrations safely below the lower limit of inflammability the 1,000-cubic-foot chamber described in a previous report (*3*) was used.

COMPUTATION AND ANALYSIS OF VAPOR-AIR MIXTURES

The concentrations of vapor in air were estimated for control purpose in creating experimental conditions by computation from the quantity of air flowing through the meter and the quantity of liquid entering the vaporizing system. In those experiments performed in a static atmosphere in the 1,000-cubic-foot chamber the calculations were based on amount of liquid vaporized and the volume of the chamber. The computed values were frequently checked by analysis, using air-equilibrated activated charcoal to adsorb the gas from a measured volume of the vapor-air mixture and determining the gain in weight. It was, however, necessary in this case to modify the usual adsorption train by the removal of the soda lime, as the latter caused hydrolysis of the methyl formate.

PROCEDURE FOR EXPOSING ANIMALS

All exposures to a given test condition were made with groups of six guinea pigs. The small chamber used for dealing with explosive mixtures accommodated only one group of six, but as many as four groups were simultaneously exposed in the large chamber. The individual groups were removed at predetermined intervals.

DESCRIPTION AND CARE OF ANIMALS

The description and care of animals were the same as described in the report on ethylene dichloride (*1*).

RESULTS OF TESTS

This report presents the summarized results pertinent to signs or symptoms, fatality, and gross pathology.

OBJECTIVE SYMPTOMS

Control animals.—No signs or symptoms were exhibited by the control guinea pigs taken at random from the stock animals used in these tests. No deaths occurred.

Exposed animals.—The signs or symptoms exhibited by animals exposed to methyl formate vapor in the order of their occurrence were as follows: Nasal and eye irritation, manifested by rubbing the nose with the forepaws and squinting; lacrimation; retching movements; static and motor ataxia; marked respiratory effects; apparent unconsciousness; incoordination of extremities; and death. Table 1 gives the average time necessary to produce these symptoms by various concentrations of methyl formate vapor in air. The figures given indicate the average time for occurrence of the symptom excepting those in parentheses which indicate that the particular symptom did not occur in the maximum period of exposure as given.

TABLE 1.—*Signs and symptoms produced in guinea pigs exposed to vapors of methyl formate*

Type of symptom	Concentration of vapor in percent by volume				
	5.0	2.5	1.0	0.35	0.15
	Duration of exposure, minutes				
Nasal irritation (rubbing nose)	1 2	2	2	3	5
Eye irritation (squinting)	2 3	2-3	2 3	3 10	[1] (480)
Lacrimation	2 3	2 3	2-3	[1] (480)	[1] (480)
Retching, spasmodic contraction of abdominal wall, head lifted, mouth open	4 5	4-10	6-15	10-30	[1] (480)
Slow, deep respiration	15 20	20 40	75-120	[1] (480)	[1] (480)
Incoordination	10 20	30 40	120-135	[1] (480)	[1] (480)
Narcosis	20 25	40 50	120 150	[1] (480)	[1] (480)
Uncoordinated scratching movement of extremities	20 25	50-70	120 150	[1] (480)	[1] (480)
Death	25 35	50-72	150-175	[1] (480)	[1] (480)

[1] Not observed during maximum exposure as given in parentheses.

The only abnormal sign observed during or following an exposure of 480 minutes to 0.15 percent methyl formate vapor in air was nasal irritation as evidenced by rubbing nose. An exposure of 480 minutes to 0.35 percent produced both nasal and eye irritation, and retching, but no further manifestations. Exposure to 1 percent methyl formate vapor produced nasal irritation in 2 minutes; eye irritation and

lacrimation in 2 to 3 minutes; retching in 6 to 15 minutes; respiratory changes in 75 to 120 minutes; incoordination in 120 to 135 minutes; narcosis and uncoordinated movements of extremities in 120 to 150 minutes; and death in 150 to 175 minutes. The time for the occurrence of these signs or symptoms, with the exception of nasal and eye irritation and lacrimation, decreased with increase in concentration, and death was produced in 50 to 72 minutes' exposure to 2.5 percent, and in 25 to 35 minutes' exposure to 5 percent methyl formate vapor in air.

GROSS PATHOLOGY

Control animals.—The 15 control animals killed for autopsy exhibited no significant gross pathology.

Exposed animals. Exposures of 25 to 35 minutes to 5 percent vapor, 50 to 72 minutes to 2.5 percent vapor, and 150 to 175 minutes to 1 percent vapor produced death at the end of exposure (see fig. 1). The gross pathological findings in these animals were intense congestion, emphysema, and edema of the lungs. A frothy, bloody exudate was present on cut surface of the lung. The kidneys and liver were deep red to purple in color, and the cut section was red and dripped blood. The meningeal vessels of the brain and surface vessels of the adrenals were congested. The finest radicles, which are not readily observed in controls, were visible.

Exposure of 10 minutes to 5 percent, 30 minutes to 2.5 percent, 30 and 60 minutes to 1.0 percent, and 180 and 480 minutes to 0.35 percent did not produce death (see fig. 1). A mild degree of gross pathology was found in some of the animals killed immediately after exposure. The findings were principally slight congestion, emphysema, and edema of the lungs, slight hyperemia of the liver and kidneys, and a slight congestion of the surface vessels of the brain and adrenals. These findings were absent in animals of the same groups killed 4 to 10 days following exposure, with the exception of the group exposed for 10 minutes to 5 percent; a slight congestion and edema of the lungs was noted in animals of this group killed 4 days after exposure and areas of consolidation in the lungs and hyperemia of the other organs in those killed 8 days following the exposure.

No gross pathological changes were found in animals exposed for 30 and 60 minutes to 0.35 percent and 180 minutes and 480 minutes to 0.15 percent vapor, either immediately after exposure or after 4 and 8 days. Also no deaths occurred.

SUMMARY OF FATALITY AHD PHYSIOLOGICAL RESPONSE

Figure 1 shows graphically the fatality and summary of the response of guinea pigs exposed to methyl formate vapor in air. The results of each experiment are designated by a symbol which represents one of

four degrees of severity. The symbols represent the most severe response for a majority or at least 3 of a group of 6 animals exposed to a given condition. The response of none of the animals deviated markedly from that which is representative of the group. In addition to representing the response of each group by symbols, the symbols have been separated into three general fields or zones of probable response.

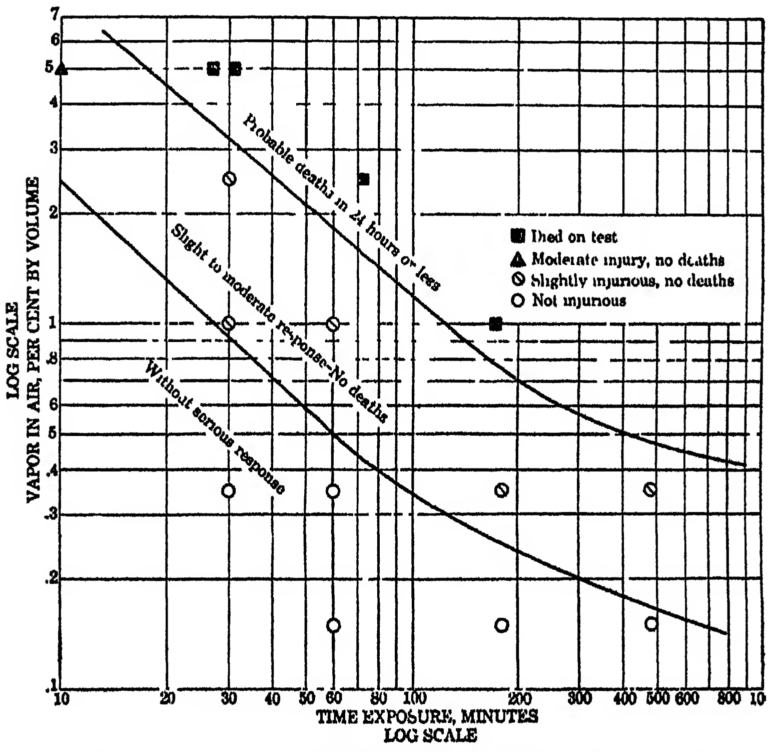

FIGURE 1.—Acute effect of exposure of guinea pigs to methyl formate vapor in air

Table 2 gives concentrations obtained by direct experiment or extrapolated from table 1 and figure 1 which produce the degrees of response generally reported for noxious gases. These data may be compared with toxicological data for other compounds (*1*, *4*, *5*, *6*, *7*).

TABLE 2.—*Acute effects of exposure of guinea pigs to methyl formate vapor in air*

Acute effects after various periods of exposure	Concentration, per cent by volume in air
Kills in 20 to 30 minutes	5 0
Dangerous to life in 30 to 60 minutes	1. 5 2 5
Maximum amount for 60 minutes without serious disturbance	.5
Maximum amount for several hours without serious disturbance	.15 .20

CAUSE OF DEATH DURING EXPOSURE

It is believed that death was due primarily to irritation of the lungs. This is evidenced by the finding of emphysema, congestion, and edema of the lungs. There was slight congestion of the brain, probably indicative of a narcotic action. However, this action was apparently less important than the lung irritation.

WARNING PROPERTIES AND HAZARDS OF ACUTE POISONING

Men exposed for 1 minute to 0.15 percent vapor in air noticed the pleasant ethereal odor of methyl formate, but experienced no nasal or eye irritation or other signs or symptoms. While the odor of methyl formate is distinct and noticeable in concentrations which are relatively safe from the standpoint of producing acute poisoning, owing to its pleasant nature and the occurrence of olfactory fatigue it is doubtful whether the odor of methyl formate will serve as an effective warning of harmful conditions of exposure.

WARNING PROPERTIES AND EXPLOSION HAZARDS

The lower limit of inflammability of methyl formate is about 5 percent (*8*). This concentration is readily detectable by odor and irritation properties.

COMPARISON WITH TOXICITY REPORTED IN THE LITERATURE

Little published information on the toxicity of methyl formate has come to the attention of the authors. Chlopin (*9*) includes it in a table of coefficients of the relative toxicities of gases and vapors on the scale chlorine = 1. On that basis a coefficient of 2.6 is assigned methyl ester of formic acid (methyl formate). Using the figures given in various reports (*4*, *5*, *6*, *7*) for the toxicity of chlorine, it would appear that the toxicity for methyl formate as indicated by Chlopin is many times greater than that found in the experimental work performed by the Bureau of Mines. The reason for this disagreement is not apparent. Flury and Zernik (*7*), in their book "Schädliche Gase", report results obtained using a 90 to 95 percent preparation. Their results are similar to those obtained by the authors. Duquénois and Revel (*10*) have reported a number of cases of poisoning from using a mixture of methyl and ethyl formates and methyl and ethyl acetates, and also results obtained using frogs as experimental animals. As no concentrations are given, comparison with their work cannot be made. The Underwriters' Laboratories (*11*) also conducted experiments on the acute toxicity of methyl formate. They used concentrations of 0.9 to 1 percent and 2 to 2.5 percent. No deaths were produced in their experiments by an

exposure of 120 minutes to 1 percent although the animals were severely affected; in the Bureau of Mines tests death occurred after 150 to 172 minutes. An exposure to 2 to 2.5 percent for 60 minutes (Underwriters' Laboratories) caused the death of 2 out of 3 guinea pigs within 14 hours after termination of exposure, and death of 1 out of 3 guinea pigs within 14 hours after termination of a 120 minute exposure; in the Bureau experiments death was produced during exposure to 2.5 percent in from 50 to 72 minutes. Although there are some differences in the time recorded for the appearance of some of the symptoms, especially incoordination (probably due to a different interpretation of this response), data on other symptoms and the time for the occurrence of death agree satisfactorily.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs exposed to air containing methyl formate vapor was determined. The concentrations of vapor and periods of exposure range from those which produce death in a few minutes to those which produce no apparent effect after several hours. The signs of response and the fatality and gross pathology are given.

1. In their order of occurrence the symptoms produced in guinea pigs were nose and eye irritation, retching movement, incoordination, narcosis accompanied by uncoordinated movements of the extremities, and death.

2. Methyl formate vapor was found to be irritating to the lungs. Congestion and edema were the most constant and prominent findings after exposure which resulted in death. A hyperemia of the liver and kidneys and congestion of the surface vessels of the brain and adrenals usually accompanied the lung changes. Lung irritation was frequently found immediately after exposure which did not cause death, but was absent in animals examined 4 to 10 days following exposure.

3. The summarized physiological responses for a single exposure are as follows: 5 percent kills in 20 to 30 minutes, 1.5 to 2.5 percent is dangerous in 30 to 60 minutes, 0.5 percent is considered the maximum amount for 60 minutes' exposure without serious disturbances, and 0.15 to 0.20 percent is the maximum amount for exposure for several hours without serious disturbances.

4. The odor of methyl formate is distinct in relatively safe concentrations, but owing to its pleasant nature and the occurrence of olfactory fatigue the possibility of an explosion hazard should be recognized and the material handled with proper precautions.

ACKNOWLEDGMENTS

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DEATHS DURING WEEK ENDED SEPTEMBER 5, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 5, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	6,900	6,739
Deaths per 1,000 population, annual basis	9.6	9.4
Deaths under 1 year of age	491	497
Deaths under 1 year of age per 1,000 estimated live births	44	46
Deaths per 1,000 population, annual basis, first 36 weeks of year	12.4	11.6
Data from industrial insurance companies:		
Policies in force	68,372,118	67,556,780
Number of death claims	10,527	8,150
Death claims per 1,000 policies in force, annual rate	8.1	6.3
Death claims per 1,000 policies, first 36 weeks of year, annual rate	10.1	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officer

Reports for Weeks Ended Sept. 12, 1936, and Sept. 14, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 12, 1936, and Sept. 14, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935
New England States:								
Maine		3				15	0	0
New Hampshire					2		0	1
Vermont		2				3	0	0
Massachusetts	0	6			30	17	1	2
Rhode Island		2			1	2	0	1
Connecticut	4	1		1	4	4	0	0
Middle Atlantic States:								
New York	10	22	[1] 7	[1] 3	41	65	10	18
New Jersey	2	7	7	7	20	10	2	6
Pennsylvania	11	23			14	32	5	8
East North Central States:								
Ohio	14	21	14	43	9	13	2	2
Indiana	10	24	9	18	3		1	3
Illinois	19	45	3	5	6	18	3	2
Michigan	12	9		1	9	10	3	2
Wisconsin	2	2	6	28	12	44	1	2
West North Central States:								
Minnesota	5	6	2	2	6	6	0	3
Iowa	2	19				1	1	0
Missouri	10	37	14	45	1	33	2	1
North Dakota	1	3	5		2	7	0	2
South Dakota					5		0	0
Nebraska	6	11			3	1	0	0
Kansas	9	10	1	2	4	4	0	0
South Atlantic States:								
Delaware						2	0	0
Maryland [2,3]	4	14	1		0	2	3	1
District of Columbia	9	15					1	2
Virginia	33	21				6	3	2
West Virginia	7	32	14	28	7	3	3	2
North Carolina [3]	65	41	0	3		2	4	0
South Carolina	18	13	67	112		1	1	0
Georgia [4]	28	36					0	1
Florida [4]	10	3		1	3	1	0	0
East South Central States:								
Kentucky	9	29		7	17	1	10	0
Tennessee	29	39	7	17	3	2	5	7
Alabama [4]	31	34	13	31		2	2	0
Mississippi [3,4]	15	21					2	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 12, 1936, and Sept. 14, 1935—Continued

Division and State	Diphtheria: Week ended Sept. 12, 1936	Diphtheria: Week ended Sept. 14, 1935	Influenza: Week ended Sept. 12, 1936	Influenza: Week ended Sept. 14, 1935	Measles: Week ended Sept. 12, 1936	Measles: Week ended Sept. 14, 1935	Meningococcus meningitis: Week ended Sept. 12, 1936	Meningococcus meningitis: Week ended Sept. 14, 1935
West South Central States:								
Arkansas	17	[illegible]	3	[illegible]			0	0
Louisiana[1]	7	10	17	[illegible]		8	1	0
Oklahoma[5]	10	14	[illegible]	13	1	1	0	1
Texas[4]	3	41	[illegible]	1	[illegible]		1	1
Mountain States:								
Montana	[illegible]	1		1	1		0	1
Idaho	1			[illegible]			0	0
Wyoming	1					2	0	0
Colorado		[illegible]			[illegible]	4	0	0
New Mexico		11			3	1	0	0
Arizona	3		[illegible]	3	1	1	0	3
Utah					3	1	0	0
Pacific States:								
Washington		[illegible]			15	11	0	0
Oregon	1		1		3	31	[illegible]	0
California[4]	[illegible]	1	18	[illegible]	15	[illegible]	0	[illegible]
Total	150	[illegible]	[illegible]	1[illegible]	[illegible]3	13[illegible]	[illegible]3	50
First 37 weeks of year	1[illegible]	[illegible]	[illegible]	10 [illegible]	[illegible]71 [illegible]	[illegible]	[illegible] 101	1 131

Division and State	Poliomyelitis: Week ended Sept. 12, 1936	Poliomyelitis: Week ended Sept. 14, 1935	Scarlet fever: Week ended Sept. 12, 1936	Scarlet fever: Week ended Sept. 14, 1935	Smallpox: Week ended Sept. 12, 1936	Smallpox: Week ended Sept. 14, 1935	Typhoid fever: Week ended Sept. 12, 1936	Typhoid fever: Week ended Sept. 14, 1935
New England States:								
Maine	1	12	[illegible]	[illegible]	0	0	0	1
New Hampshire	0	4	[illegible]	0	0	0	0	0
Vermont	0	[illegible]	1	1	0	0	0	0
Massachusetts	4	113	31	[illegible]	0	0	[illegible]	[illegible]
Rhode Island	0	31	[illegible]	3	0	0	3	0
Connecticut	0	[illegible]	10	22	0	0	2	3
Middle Atlantic States:								
New York	11	[illegible]	100	1[illegible]3	0	0	[illegible]0	14
New Jersey	1	[illegible]1	1[illegible]	13	0	0	[illegible]	8
Pennsylvania		38	[illegible]	11[illegible]	0	0	13	[illegible]2
East North Central States:								
Ohio	18	10	83	91	0	1	60	11
Indiana		3	6	17	0	0	13	13
Illinois		18	[illegible]	[illegible]0	3	0	[illegible]	19
Michigan	[illegible]	[illegible]	1	5	0	0	11	8
Wisconsin	4	8	[illegible]5	[illegible]8	1	2	1	3
West North Central States:								
Minnesota	1	8	1[illegible]	1[illegible]	0	0	[illegible]	7
Iowa	7	4	24	[illegible]9	1	0	[illegible]	5
Missouri	[illegible]	1	18	6	0	0	31	[illegible]0
North Dakota	0	0	1	10	0	1	1	2
South Dakota	0	2	10	11	0	5	3	1
Nebraska	3	0	5	20	1	0	1	0
Kansas	5	1	26	37	0	0	9	10
South Atlantic States:								
Delaware	[illegible]	0			0	0	1	1
Maryland	1	[illegible]	15	21	0	0	11	15
District of Columbia	0	0	10	5	0	0	1	1
Virginia	2	21	11	[illegible]8	0	0	27	[illegible]1
West Virginia	4	8	30	12	0	0	23	[illegible]3
North Carolina[4]	2	11	23	11	0	1	13	23
South Carolina	0	0	5	2	0	0	16	15
Georgia[4]	12	2	2	9	0	0	38	31
Florida[4]	0	0	2	3	0	0	2	3

See footnotes at end of table

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 12, 1936, and Sept. 14, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935	Week ended Sept. 12, 1936	Week ended Sept. 14, 1935
East South Central States:								
Kentucky	1	18	28	48	0	0	43	38
Tennessee	21	4	25	56	0	0	11	37
Alabama [4]	15	1	11	17	0	0	28	11
Mississippi [2] [4]	5	0	8	12	1	0	21	9
West South Central States:								
Arkansas	0	3	3	8	0	0	17	11
Louisiana [4]	1	1	4	3	0	0	26	17
Oklahoma [5]	1	0	6	9	0	0	28	20
Texas [4]	1	1	19	17	0	0	29	46
Mountain States:								
Montana	1	0	11	21	10	0	0	3
Idaho	2	0	1	1	0	0	1	6
Wyoming	1	0	6	4	0	0	1	0
Colorado	4	0	8	13	2	0	2	0
New Mexico	0	0	5	3	0	0	10	23
Arizona	0	4	1	6	0	0	0	3
Utah [2]	1	0	13	16	1	0	1	0
Pacific States:								
Washington	2	0	13	17	2	5	5	6
Oregon	2	2	10	33	0	0	8	0
California [4]	13	10	75	91	0	1	7	11
Total	218	849	980	1,562	22	16	669	633
First 37 weeks of year [6]	2,010	7,273	187,451	184,983	6,190	5,423	9,268	12,104

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Sept. 12, 1936, 6 cases, as follows: Maryland, 2; North Carolina, 4.
[4] Typhus fever, week ended Sept. 12, 1936, 73 cases, as follows: Georgia, 40; Florida, 3; Alabama, 7; Mississippi, 1; Louisiana, 1; Texas, 20; California, 1.
[5] Exclusive of Oklahoma City and Tulsa.
[6] The totals have been corrected.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1936										
Puerto Rico	-------	44	316	751	265	-------	1	-------	0	64
July 1936										
Colorado	1	8	-------	-------	32	-------	-------	50	3	12
Hawaii Territory	2	6	215	-------	5	-------	0	1	0	3
August 1936										
Arkansas	-------	16	11	311	-------	32	1	16	0	55
Indiana	7	38	20	2	8	-------	4	68	1	43
Iowa	8	13	3	1	3	-------	6	70	7	22
Nebraska	2	21	-------	-------	21	-------	3	43	-------	6
North Carolina	7	92	11	-------	16	106	9	78	1	129
Rhode Island	-------	1	-------	-------	5	-------	1	26	0	4
Wyoming	-------	2	-------	-------	2	-------	0	23	7	4

Summary of Monthly Reports from States—Continued

June 1936

	Cases
Puerto Rico:	
Chicken pox	8
Dysentery	170
Filariasis	2
Leprosy	1
Mumps	12
Ophthalmia neonatorum	3
Puerperal septicemia	6
Tetanus	[illegible]
Tetanus, infantile	3
Trachoma	4
Whooping cough	10
Yaws	1

July 1936

	Cases
Colorado:	
Chicken pox	15
Mumps	61
Typhus fever	1
Whooping cough	1[illegible]2
Hawaii Territory:	
Chicken pox	1
Dysentery (amoebic)	1
Leprosy	3
Mumps	33
Paratyphoid fever	[illegible]
Typhus fever	1
Whooping cough	17

August 1936

	Cases
Chicken pox:	
Arkansas	11
Indiana	[illegible]
Iowa	15
Nebraska	7
North Carolina	14
Rhode Island	1
Wyoming	6
Dysentery:	
Iowa (bacillary)	1
North Carolina (bacillary)	2
Epidemic encephalitis:	
Iowa	3
Rhode Island	1
German measles:	
North Carolina	16
Rhode Island	23
Mumps:	
Arkansas	14
Indiana	16
Iowa	8
Nebraska	1
Rhode Island	3
Wyoming	12
Ophthalmia neonatorum:	
North Carolina	8
Rhode Island	1
Paratyphoid fever:	
North Carolina	3

August 1936—Continued

	Cases
Rabies in animals:	
Indiana	14
Rocky Mountain spotted fever:	
North Carolina	9
Septic sore throat:	
Nebraska	1
North Carolina	16
Rhode Island	2
Wyoming	2
Tularaemia:	
Arkansas	1
Iowa	1
Wyoming	5
Typhus fever:	
North Carolina	1
Undulant fever:	
Arkansas	2
Indiana	1
Iowa	15
North Carolina	1
Rhode Island	1
Whooping cough:	
Arkansas	[illegible]
Indiana	80
Iowa	70
Nebraska	9[illegible]
North Carolina	1[illegible]1
Rhode Island	71
Wyoming	6

Cases of Venereal Diseases Reported for July 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rate per 10,000 population	Cases reported during month	Monthly case rate per 10,000 population
Alabama	911	3.70	84	1.00
Arizona	16	.41	78	1.70
Arkansas	10	1.05	107	.71
California	1,3[illegible]	2.1[illegible]	1,398	2.18
Colorado[1]				
Connecticut	217	1.28	140	.82
Delaware	151	6.02	44	1.72
District of Columbia	[illegible]0	3.[illegible]0	236	3.97
Florida	308	1.[illegible]1	113	.70
Georgia	1,11[illegible]	3.[illegible]	561	1.[illegible]9
Idaho	13	.27	44	.98
Illinois	1,500	1.9[illegible]	1,007	1.[illegible]
Indiana	104	.30	77	.22
Iowa	91	.37	155	.63
Kansas	121	.67	84	.45
Kentucky				
Louisiana	278	1.31	170	.80
Maine	4[illegible]	.50	57	.67
Maryland	982	5.34	254	1.52
Massachusetts	476	1.03	545	1.25
Michigan	463	.93	530	1.14
Minnesota	315	1.20	300	1.18
Mississippi	1,378	7.03	2,056	10.[illegible]5
Missouri	261	.67	245	.63
Montana[1]				
Nebraska	12	.31	93	.65
Nevada				
New Hampshire	10	.20	19	.38
New Jersey	581	1.35	210	.61
New Mexico	73	1.82	39	.97
New York	8,611	6.70	1,727	1.84

See footnotes at end of table.

Reports from States—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
North Carolina	1,939	5.66	410	1.29
North Dakota	[illegible]	.10	81	1.20
Ohio	661	[illegible]	[illegible]	.11
Oklahoma	118	[illegible]	211	.51
Oregon	38	[illegible]	97	.06
Pennsylvania	521	.12	105	.10
Rhode Island	88	1.29	[illegible]	.75
South Carolina	210	[illegible]	[illegible]	1.12
South Dakota	10	.15	[illegible]	.12
Tennessee	117	3.16	458	1.18
Texas	[illegible]	.75	172	.18
Utah [1]				
Vermont	31	.90	[illegible]	1.41
Virginia	[illegible]	1.81	[illegible]	.90
Washington	158	.85	241	1.48
West Virginia	177	[illegible]	77	.12
Wisconsin [3]	21	.05	188	.05
Wyoming [1]				
Total	[illegible]	2.09	13,812	1.13

Reports from cities of 200,000 population or over

Akron, Ohio	20	0.90	17	0.63
Atlanta, Ga.[2]				
Baltimore, Md	471	5.71	156	1.89
Birmingham, Ala	141	5.10	60	2.13
Boston, Mass	208	2.63	222	2.81
Buffalo, N. Y.[4]				
Chicago, Ill	922	2.58	617	1.81
Cincinnati, Ohio	88	1.89	60	1.29
Cleveland, Ohio	200	2.15	118	1.27
Columbus, Ohio	40	1.31	19	.62
Dallas, Tex	76	2.62	19	.66
Dayton, Ohio[2]				
Denver, Colo	23	.78	34	1.15
Detroit, Mich	161	.93	205	1.18
Houston, Tex.[4]	253	7.55	82	2.45
Indianapolis, Ind	32	.85	40	1.06
Jersey City, N. J.[2]				
Kansas City, Mo	50	1.19	5	.12
Los Angeles, Calif	367	2.56	416	2.91
Louisville, Ky	281	8.67	187	5.77
Memphis, Tenn	161	6.03	65	2.43
Milwaukee, Wis	11	.18	18	.29
Minneapolis, Minn	73	1.50	89	1.83
Newark, N. J	205	6.37	108	2.33
New Orleans, La.[2]				
New York, N. Y	6,450	8.83	1,238	1.70
Oakland, Calif.[2]				
Omaha, Nebr	16	.73	13	.59
Philadelphia, Pa	211	1.00	60	.30
Pittsburgh, Pa.[2]				
Portland, Oreg.[2]				
Providence, R. I.[2]				
Rochester, N. Y.[2]				
St. Louis, Mo	109	1.30	87	1.04
St. Paul, Minn	42	1.49	50	1.77
San Antonio, Tex.[1]				
San Francisco, Calif	134	2.00	158	2.36
Seattle, Wash	68	1.79	105	2.77
Syracuse, N. Y.[2]				
Toledo, Ohio	45	1.48	33	1.08
Washington, D. C.[5]	220	4.43	236	4.75

[1] Not reporting.
[2] No report for current month.
[3] Only cases of syphilis in the infectious stage are reported.
[4] Reported by the Jefferson Davis Hospital. Physicians are not required to report venereal diseases.
[5] Reported by social hygiene clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 5, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Maine:											
Portland	0		0	0	1	0	0	0	0	0	18
New Hampshire:											
Concord	0		0	0	0	0	0	0	0	0	4
Manchester	0		0	0	0	0	0	1	0	0	7
Nashua	0			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	0	0	0	0	0	0	0	9
Rutland	0		0	0	0	0	0	0	0	0	7
Massachusetts:											
Boston	1		0	7	6	8	0	9	1	46	183
Fall River	0		0	0	0	3	0	0	0	0	19
Springfield	0		0	0	0	0	0	1	0	0	31
Worcester	0		0	1	4	4	0	2	0	27	35
Rhode Island:											
Pawtucket											
Providence	0		0	0	2	6	0	2	2	19	42
Connecticut:											
Bridgeport	0	1	0	1	0	0	0	0	0	3	23
Hartford	0		0	0	0	2	0	2	0	5	128
New Haven	0		0	0	0	0	0	0	0	5	34
New York:											
Buffalo	1		1	4	3	6	0	11	1	8	139
New York	11	4	3	40	61	19	0	74	14	93	1,143
Rochester	0		0	0	0	0	0	3	0	7	65
Syracuse	0		0	0	0	1	0	1	0	26	41
New Jersey:											
Camden	0		0	0	0	0	0	2	0	0	26
Newark	0		0	2	2	2	0	6	1	18	76
Trenton	0		0	0	1	0	0	2	0	1	35
Pennsylvania:											
Philadelphia	0	2	1	2	14	15	0	25	3	86	343
Pittsburgh	2	1	0	1	13	8	0	3	3	41	127
Reading	0		0	0	1	0	0	0	0	17	27
Scranton	0			1		2	0		0	2	
Ohio:											
Cincinnati											
Cleveland	4	5	0	1	6	17	0	8	1	51	155
Columbus	1		0	0	1	4	0	3	0	6	64
Toledo	0		0	2	1	0	0	5	0	23	57
Indiana:											
Anderson	0		0	0	0	0	0	0	0	0	7
Fort Wayne	0		0	0	0	0	0	0	0	0	18
Indianapolis	2		0	2	5	5	0	7	0	1	73
Muncie	0		0	0	0	0	0	1	0	0	7
South Bend	0		0	0	0	0	0	2	0	0	12
Terre Haute	0		0	0	0	0	0	0	0	0	16
Illinois:											
Alton	0		0	0	1	0	0	0	0	0	13
Chicago	10		0	1	26	33	0	34	3	58	555
Elgin	0		0	0	0	0	0	0	0	8	5
Moline	0	1	1	0	0	0	0	0	0	5	6
Springfield	0		0	0	1	0	0	1	1	1	18
Michigan:											
Detroit	2		0	7	13	11	0	23	5	80	222
Flint	0		0	1	3	0	0	0	0	0	22
Grand Rapids	0		0	0	0	2	0	0	0	4	23
Wisconsin:											
Kenosha	0		0	0	0	5	0	1	0	3	5
Madison	0		0	1	0	2	0	0	0	3	21
Milwaukee	0		0	1	6	2	0	3	1	65	92
Racine	0		0	0	1	3	0	0	0	0	11
Superior	0		0	0	0	1	0	0	0	0	2
Minnesota:											
Duluth	0		0	1	0	1	0	2	2	7	28
Minneapolis	0		0	0	1	3	0	2	0	1	92
St. Paul	0		0	0	4	6	0	2	0	13	43

City reports for week ended Sept. 5, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0			0		0	0		0	1	
Davenport	0			0		0	0		0	0	
Des Moines	0			0		0	0		0	0	30
Sioux City	1			0		5	1		0	0	
Waterloo	0			0		0	0		0	0	
Missouri:											
Kansas City	0		0	0	5	0	0	5	0	0	78
St. Joseph	1		0	0	2	0	0	3	1	5	35
St. Louis	4		0	0	1	8	0	14	5	14	211
North Dakota:											
Fargo	0		0	0	0	0	0	0	0	0	3
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	2	0	0	0	7
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	6
Nebraska:											
Omaha	6			1	2	1	0	3	0	1	54
Kansas:											
Topeka	0		0	0	1	1	0	0	1	0	
Wichita	0		0	0	1	0	0	0	0	0	24
Delaware:											
Wilmington	0		0	0	2	0	0	1	0	1	20
Maryland:											
Baltimore	0	2	1	0	13	4	0	17	2	107	165
Cumberland	0	1	0	0	0	1	0	0	0	0	5
Frederick	0		0	0	1	0	0	0	0	0	4
District of Columbia:											
Washington	9		0	1	3	6	0	3	0	26	118
Virginia:											
Lynchburg	3		0	1	1	1	0	2	0	0	13
Norfolk	1		0	2	1	0	0	1	1	0	23
Richmond	1		0	0	0	1	0	2	0	3	50
Roanoke	3		0	0	0	0	0	0	0	0	9
West Virginia:											
Charleston	0		0	0	0	1	0	0	1	0	11
Huntington	2			0		3	0		0	0	
Wheeling	0		0	0	0	0	0	2	2	0	8
North Carolina:											
Gastonia	0			0		0	0		0	0	
Raleigh	0		0	0	1	0	0	1	1	0	15
Wilmington	3		0	0	0	1	0	0	0	0	14
Winston-Salem	1		0	0	0	0	0	0	0	0	7
South Carolina:											
Charleston	0		0	0	4	0	0	2	0	0	20
Florence	0		0	0	1	0	0	0	0	0	9
Greenville	2		0	0	1	0	0	1	0	0	13
Georgia:											
Atlanta	0	3	0	0	8	0	0	3	3	0	71
Brunswick	0		0	0	0	0	0	0	0	0	1
Savannah	3		0	0	1	0	0	4	4	1	35
Florida:											
Miami	0		0	0	2	0	0	1	0	0	35
Tampa	0		0	0	0	2	0	0	1	0	26
Kentucky:											
Ashland	0			0		1	0	1	0	0	21
Covington	0		0	0	0	0	0	0	0	0	6
Lexington	0		0	4	2	0	0	2	0	0	10
Louisville	0		0	1	3	1	0	4	1	3	70
Tennessee:											
Knoxville	1		0	1	2	0	0	1	2	0	33
Memphis	0		0	1	2	0	0	5	2	1	77
Nashville	1		0	0	0	2	0	5	0	0	55
Alabama:											
Birmingham	1	1	0	0	3	3	0	4	4	1	55
Mobile	2		0	0	1	1	0	1	1	0	22
Montgomery	1			0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		0	0	
Little Rock	0		0	0	3	0	0	2	0	0	6
Louisiana:											
Lake Charles	0		0	0	2	0	0	0	0	0	8
New Orleans	1	1	1	0	11	0	0	10	8	1	154
Oklahoma:											
Oklahoma City	3		0	0	3	1	0	3	2	0	43

City reports for week ended Sept. 5, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Texas:											
Dallas	3		0	2	2	3	0	1	1	3	51
Galveston	0		0	0	1	0	0	2	0	0	15
Houston	0		1	0	4	0	0	4	0	0	74
San Antonio	1		1	1	3	0	0	6	0	0	51
Montana:											
Billings	0		0	0	1	2	0	0	0	0	3
Great Falls	0		0	0	1	0	0	0	0	0	8
Helena	0		0	0	0	0	0	0	0	0	5
Missoula	0		0	0	0	0	0	0	2	0	7
Idaho:											
Boise	0		0	0	2	0	0	0	0	0	11
Colorado:											
Colorado Springs	0		0	1	0	1	0	1	0	1	11
Denver	3		0	2	4	3	0	2	1	35	85
Pueblo	0		0	0	0	1	0	0	0	0	5
New Mexico:											
Albuquerque	0		0	0	1	0	0	8	1	0	20
Utah:											
Salt Lake City	0		0	1	1	5	0	0	0	0	27
Nevada:											
Reno											
Washington:											
Seattle	0		0	1	2	1	0	3	0	0	81
Spokane	0		0	2	3	3	0	3	0	3	
Tacoma	0		0	1	1	1	0	1	0	0	34
Oregon:											
Portland	0		0	1	4	2	0	4	0	0	80
Salem	0			0		0	0		0	0	
California:											
Los Angeles	10	8	0	3	11	6	0	32	2	48	258
Sacramento	1		0	1	1	7	0	2	2	27	25
San Francisco	1		0	4	11	16	0	5	2	27	150

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases	State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:				Maryland:			
Boston	0	0	2	Baltimore	1	2	0
New York:				Virginia:			
New York	4	1	6	Lynchburg	0	0	2
Rochester	0	0	2	Roanoke	0	0	1
Syracuse	0	0	2	West Virginia:			
New Jersey:				Wheeling	1	0	0
Newark	1	1	0	North Carolina:			
Pennsylvania:				Winston-Salem	1	0	0
Philadelphia	0	0	1	Georgia:			
Reading	1	1	0	Atlanta	1	1	0
Ohio:				Florida:			
Toledo	0	0	3	Miami	0	0	1
Indiana:				Tennessee:			
Indianapolis	0	0	1	Knoxville	0	1	2
Illinois:				Memphis	0	0	4
Chicago	3	1	13	Alabama:			
Springfield	0	0	1	Birmingham	0	0	3
Michigan:				Oklahoma:			
Detroit	1	1	3	Oklahoma City	0	1	0
Wisconsin:				Colorado:			
Kenosha	0	0	1	Denver	4	0	1
Madison	0	0	1	Washington:			
Milwaukee	0	0	1	Spokane	0	0	1
Superior	0	0	1	California:			
Minnesota:				Los Angeles	1	0	11
Minneapolis	1	1	0	Sacramento	1	0	1
Iowa:				San Francisco	0	0	1
Des Moines	0	0	1				
Missouri:							
St. Louis	1	1	2				

Epidemic encephalitis.—Cases: New York, 1; Louisville, 1; Great Falls, Mont., 5; Denver, 2.
Pellagra.—Cases: Boston, 1; Charleston, S. C., 3; Birmingham, 2; New Orleans, 1; Los Angeles, 1.
Rabies in man.—Deaths: Chicago, 1.
Typhus fever.—Cases: Atlanta, 1; Savannah, 4; Birmingham, 2.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—June 1936.—During the month of June 1936, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax			Paratyphoid fever	11	
Cerebrospinal meningitis	1		[illegible]	1	1
Chicken pox	[illegible]		Puerperal fever		16
Diphtheria	[illegible]	[illegible]	Scarlet fever	11	18
Dysentery	[illegible]	1	Trachoma	[illegible]	
Influenza	1		Typhoid fever		13
Lethargic encephalitis	1		Typhus fever	3	
Malaria	[illegible]				

EGYPT

Infectious diseases—Fourth quarter 1935.—During the fourth quarter of 1935, certain infectious diseases were reported in Egypt as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	3	1	Plague		4
Cerebrospinal meningitis	[illegible]	23	Poliomyelitis	[illegible]	
Chicken pox	[illegible]		Puerperal septicemia	[illegible]	[illegible]
Diphtheria	785	[illegible]	Rabies		4
Dysentery	[illegible]	[illegible]	Scarlet fever	10	1
Erysipelas	[illegible]	[illegible]	Tetanus	[illegible]	[illegible]
Influenza	1,100	[illegible]	Tuberculosis (pulmonary)	[illegible]	[illegible]
Leprosy	11	11	Typhoid fever	[illegible]	188
Malaria	[illegible]	30	Typhus fever	83	[illegible]
Measles	708	211	Undulant fever	[illegible]	
Mumps	[illegible]	1	Whooping cough	18	25

Vital statistics—Fourth quarter 1935.—Following are vital statistics for the fourth quarter of 1935 in all places in Egypt having a health bureau:

Population	4,603,100	Deaths per 1,000 population	[illegible]
Live births	51,861	Deaths from diarrhea and enteritis under 2 years	[illegible]
Births per 1,000 population	[illegible]	Infant mortality per 1,000 live births	1[illegible]7
Stillbirths	1,031		
Total deaths (excluding stillbirths)	28,319		

FRANCE

Vital statistics—First quarter 1936 Comparative.—Following are vital statistics for France for the first quarter of 1936, compared with the first quarter of 1935

	First quarter, 1936	First quarter, 1935		First quarter, 1936	First quarter, 1935
Marriages	[illegible]	[illegible]	Deaths under 1 year	11,939	13,989
Live births	163,54[illegible]	166,5[illegible]			
Stillbirths	6,193	6,[illegible]	Total deaths	188,037	200,016

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936: 6	13	20	27	July 1936: 4	11	18	25	August 1936: 1	8	15	22	29
Ceylon:																		
Batticaloa.[1]																		
Provinces	C			13														
India	C	13,729	16,605	24,025	21,278	4,111	3,881	3,857	3,482	[illegible]	[illegible]	[illegible]						
	D	7,153	7,955	11,745	10,634	2,095	2,010	1,733	1,771	[illegible]	[illegible]	2,162						
Assam	C	92	59	137	569	86	98	41	37	31	16	47	57	[illegible]	[illegible]	[illegible]	[illegible]	36
	D	46	30	65	292	46	41	42	16	25	11	26	13	[illegible]	[illegible]	[illegible]	1	39
Bassein	C				9	6	3	1	2	1								
Bombay Presidency	C	332	130	145	365				592	552	[illegible]		[illegible]	[illegible]				
	D	149	55	42	123				224	242	270		[illegible]	313				
Bombay	C					11					11							
Calcutta	C	350	392	799	1,012	191	133	[illegible]	[illegible]	52	[illegible]	37	[illegible]	24	[illegible]	[illegible]	[illegible]	12
Central Provinces and Berar	C	58	217	357	715	279	404	[illegible]		241	[illegible]	367	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Chittagong	C				6		7	1	5	2		3		2		[illegible]		
Madras Presidency	C	[illegible]	2,751	1,677	1,556	501	479	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,294					
	D	1,497	1,340	758	787	226	233	245	[illegible]	[illegible]	[illegible]	425	[illegible]					
Madras	C	70	26	5	2						2	4						
	D	28	11	1								1		[illegible]				
Moulmein	C	2	10	2	3	1												
Negapatam	C	56	6	2					[illegible]	9	1	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	D	27	2						[illegible]	4		1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Northwest Frontier Province	C	1																
Punjab	C			6	61	35	61	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Rangoon	C			4			11		1	[illegible]	2			[illegible]	[illegible]	[illegible]		
Sind State	C													[illegible]	[illegible]		1	
Tuticorin	C										[illegible]	[illegible]	3					

India (French):																		
Chandernagor Territory	C	6		6	2		6		1	2	1	4	1					
Karikal Province	C	91		4					8	8	37	27	45	32				
Pondichery Province	C	52	74	7	16		4			1								
Indochina (see also table below):																		
Bentre	C				1													
Pnom-Penh	C				1													
Siam:																		
Bangkok	C	375	145	59	52	8	6	10	12	7	7	3	5			1		
Provinces	C	977	961	649	288	10	9	9	6	21	22	6	17	15	9	32	[illegible]	33
On vessels:																		
S. S. *Chatala* at Rangoon from Chittagong	C		1															
S. S. *Kutsang* at Penang from Calcutta	C			1														
S. S. *Karagola* at Penang from Calcutta	C				1													
S. S. *Ekma* at Rangoon from Calcutta	C						1											

Place		March 1936			April 1936			May 1936			June 1936			July 1936		
		1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indochina (French) (see also table above):																
Cambodia [2]	C	4	4	3		2			3	1	1		1		2	
	D	4	3	3		1			2	1	1		1		2	
Cochinchina [3]	C	3	4	1	4		1	1	1	1		4	1	3	3	1
	D	3	4	1	3		1	1	1	1		4		3	3	1

[1] According to information dated Apr. 8, 1936, 31 cases of cholera with 27 deaths have occurred in the vicinity of Batticaloa, Ceylon.
[2] Imported.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936: 6	13	20	27	July 1936: 4	11	18	25	August 1936: 1	8	15	22	29
Algeria:																		
Bone	C			[2] 3														
Oran Department	C																1	
Philippeville	C																1	
Argentina[3] (see also table below): Bahia Blanca (vicinity of)	C	2																
	D	2																
Azores. (See table below.)																		
Basutoland. (See also table below.)	C	[4] 2																
Belgian Congo	C				1													
Brazil. (See also table below.)																		
Santos	C														2	1	1	
	D														1			
Sao Paulo.[5]																		
British East Africa:																		
Kenya	C	22	9	11	42	9	11	12	7	4	1	5	3	20	2	6		
Tanganyika	C	2	5		3													
Uganda	C	44	62	57	153	31	16		29	25	21	22	[illegible]	18	[illegible]	[illegible]		
	D	42	55	55	145	29	16		[illegible]	25	22	21	[illegible]	17	22	[illegible]		
Ceylon:																		
Anuradhapura	C		1															
Colombo	C	6	3	3	3		3				1	2					1	
	D	3	3	3	3		3				1	2						
Plague-infected rats		2	3	5	6		2			1	1			1				
Hatton	C				3													
Manar	C			1														
Maskiliya	C												1					
Southern Province	C																	
Weligama	C			1														

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Information dated Aug. 5, 1936, states that 4 cases of plague had been reported at Salta Province and 1 case at Tucuman Province, Argentina.
[4] Includes 1 suspected case.
[5] A report dated July 29, 1936, states that 23 cases of pneumonic plague with 15 deaths were reported in Sao Paulo, Brazil.

China: Manchuria.[6]																		
Dutch East Indies: West Java	C	966	700	604	553	98												
	D	990	689	602	550	97												
Ecuador:																		
Daule [7]	C		1															
Guayaquil	C	6	1	1										2	1			
	D	3		1												1		
Plague-infected rats			1					1	2	1	3	1		1	1	1	1	
Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P		P		P		P		P		P			
Asyut Province	C	3	13	15	2	2												
Girga Province	C	2	1	1	1													
Minya Province	C	4	5	1	1													
Suez	C					1												
France: Marseille [8]	C															1		
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district: [9]																		
Hamakua Mill		1																
Paauhau sector [9]					2							2	1		1	2		3
Polakea sector		1		4														
India	C	3,352	3,543	2,334	626	34	24	72	24	33	71	82						
	D	1,728	1,639	1,225	405	26	18	54	14	18	49	58						
Bassein	C	7	4	5	5	1	1			2	4	3			3	2		
Plague-infected rats		2													1			
Bombay Presidency	C	169	125	68	11			4					3	1				
	D	110	70	47	6			2					2					
Bombay	C							1										
Calcutta	C									1[10]								
Central Provinces and Berar	C	584	456	457	52						1	2	6	1	27	12	[illegible]	66
Karachi	C		5															
Madras Presidency	C	29	44	20	6					5	8	18	10					
	D	11	55	13	2					2	2	11	9					
Punjab	C	1	14	95	72													
	D		7	53	47													
Rangoon	C	[10]1			5			2					2	1	1			1
Plague-infected rats		5	2		1								1	2	1	1		
Indochina (see also table below):																		
Longxuyen	C						1											
Pnom-Penh	C	1			1									1	2	1		
Saigon-Cholon	C			1														
Tanghai	C			2	4													
Madagascar. (See table below.)																		
Malta	C			3	1	3								1	2			1
	D			2		1								1				

[6] A report dated Aug. 10, 1936, states that 5 cases of plague were reported at Kirin Province, Manchuria, China.
[7] During the period Jan. 1 to Feb. 20, 1936, 7 cases of plague were reported at Daule and vicinity, Ecuador.
[8] During the week ended Sept. 5, 1936, 1 case of plague was reported in Marseille, France. A report dated Sept. 3, 1936, states that 2 plague-infected rats were reported in Marseille, France.
[9] Plague-infected rats have also been reported in Hawaii Territory as follows: Week ended Aug. 5, 1936, 2 plague-infected rats in Hamakua district, no location given; week ended Sept. 12, 1936, 7 plague-infected rats were reported in Paauhau Sector, Hamakua district, Island of Hawaii.
[10] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936: 5	13	20	27	July 1936: 4	11	18	25	August 1936: 1	8	15	22	29
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C																1	
Plague-infected rats		2		2					1		1						1	
Union of South Africa	C	144	41	[11] 6	6	[11] 17		[11] 15		[11] 1						5		
United States:																		
California:																		
Lassen County—Plague-infected squirrels						1	1		3	1								
Modoc County [12]—Plague-infected squirrels						P	4	7	2	3	1			10				
Monterey County	C								1									
Santa Cruz County [12]—Plague-infected squirrels								21	29	5			6					
Santa Rosa	C			1														
Ventura County—Plague-infected squirrels				1		P												
Idaho: Bonneville County—Plague-infected squirrels							P											
Montana: Beaverhead County.[13]																		
Nevada: Elko County—Plague-infected squirrels					P													
Utah:																		
Beaver County	C									1								
Plague-infected marmots														1				
Plague-infected squirrels												1						
Garfield County [14]—Plague-infected prairie dogs															2			
Sevier County.[14]																		
On vessel: S. S. *Ipanema* at Marseille from Bone and Philippeville	C																	

[11] For 2 weeks.
[12] During the week ended June 27, 1936, 3 lots of plague-infected fleas in Modoc County, and 7 lots of plague-infected fleas in Santa Cruz County, Calif., were also reported.
[13] During the week ended July 25, 1936, 153 fleas and 26 lice taken from 7 marmots (ground hogs) shot at the head of Small Horn Canyon, Beaverhead County, Mont., were reported plague infected.
[14] Plague-infected fleas in Utah have also been reported as follows: Aug. 24, 45 fleas taken from 23 prairie dogs in Garfield County, and July 28, 1936, 315 fleas taken from 11 ground squirrels in Clear Creek Canyon, Sevier County.

Place		February 1936	March 1936	April 1936	May 1936	June 1936	July 1936
Argentina (see also table above):							
Buenos Aires Province	C	2					
Salta Province	C						4
San Luis Province	C			6			
Tucuman Province	C						1
Azores	C	4		2	2		
Brazil:							
Ceara State	C	7	54	1			
Pernambuco State	C		[15] 15				
Indochina (see also table above):							
Cambodia	C	2	1	1	1		4
Cochinchina	C			2	1	1	6
Madagascar (central region)	C	382	298	93	48	35	
	D	358	[illegible]	95	47	39	

Place		February 1936	March 1936	April 1936	May 1936	June 1936	July 1936
Peru	C	19	10	15	5	2	4
Lambayeque Department	C	3					
Libertad Department	C	1	1	6	4	1	3
Lima Department	C	8	3	6	1		1
Callao	C	2	4	1		1	
	D	2	1	1		1	
Plague-infected rats			P				
Piura Department	C	5		2			
Trujillo Department	C		2				
Senegal							
Dakar [16]	C	1				2	1
	D	1				2	1
Thies [16]	C				2	1	
Tivaouane [16]	C			1	5	4	8
South-West Africa: Ovamboland	C				23		

[15] From Jan. 1 to Mar 16, 1936.
[16] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936 6	13	20	27	July 1936 4	11	18	25	August 1936 1	8	15	22	29
Algeria:																		
Algiers Department	C	2																
Constantine Department	C			1		1			1	1								
Oran Department	C					1		5		1	1							
Angola. (See table below.)																		
Argentina (see also table below):																		
Corrientes Province	C		5															
Jujuy Province	C		7															
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil: Porto Alegre (alastrim)	C	13																
	D	1		3														
British East Africa:																		
Tanganyika	C	8	57		73		1	6		23	44	21	21	18		4		
Uganda	C	12	7															1
British Somaliland	C	34			10	1	10	6	2									
British South Africa: Southern Rhodesia	C	1																
Canada:																		
Alberta	C	3	30	1	2		2											
British Columbia	C		1															
Ontario	C			1									2					
Saskatchewan	C																	
Ceylon: Colombo	C																	
China (see also table below):																		
Amoy	C	3		1					3		1		2					
Canton	C			1									1					
Dairen	C	4	2	3	10	4			3									
Foochow	C	P	P	P	P		P		P		P							
Hangchow	C	15	5	5	6	1	1	2		1								
Hankow	C	4	1	2	1	1												
Hong Kong	C		6	[illegible]	5	2					1		1					
Nanking	C	41	35	79	75	1		7	[illegible]	4	1							
Shanghai	C	33	23	30	49	1	9	4	3	3	6	3	2	4	4		1	
Swatow	C	2	1	4														
Tientsin	C		2	1	1		2	1		1								

Chosen. (See table below.)																		
Colombia (see also table below)	C	13	88	30	60													
Dahomey. (See table below).																		
Dutch East Indies: Palembang	C		1															
Ecuador. (See table below.)																		
Egypt: Provinces	C	2	5					1	1									
Eritrea	C	1	5	2														
Asmara	C			1														
Finland	C												6	6	1			
France. (See table below.)																		
Gambia	C									35								
Great Britain: England and Wales—London and Great Towns	C				4													
Greece: Saloniki	C	14	20	20	37	8		13	13	13								
Guatemala. (See table below.)																		
India	C	34,355	31,312	34,745	36,861	4,635	4,119	4,161	3,462	2,946	2,478	2,163						
	D	8,417	7,679	9,691	9,916	1,426	1,226	1,0[illegible]	[illegible]	8[illegible]9	721	675						
Assam	C	798	321	219	270	33	13	32	17	14	9	18	13	14	17	14	14	20
Bombay Presidency	C	3,444	2,820	2,859	2,747	215	234	270	183	233	149	157	75	152				
	D	855	556	560	501	41	31	68	32	41	34	33	20	22				
Bombay	C	266	277	322	237	22	22	38	20	10	18	12	6	13	6	10	7	3
	D	149	157	135	153	14	12	24	13	6	11	5	3	8	4	10	3	3
Calcutta	C	1,496	1,305	1,552	567	70	133	40	32	27		13	6	5	13	7	11	9
	D	893	945	1,166	466	49	64	27	25	24		10	4	7	8	7	8	9
Central Provinces and Berar	C	2,652	2,109	2,526	3,043	403	339	355		147	155	115	60	63	50	[illegible]	18	23
Chittagong	D	1		1					3	11								
Cochin	C	21	7															
Karachi	C	77	28	26	19	2	1	1	1	1		1						
Madras Presidency	C	1,214	1,980	1,238	1,225	191	219	203	180	142	245	214	151					
	D	191	294	214	215	44	22	43	[illegible]	45	31	35	46					
Madras	C	3	12	1	5									1				1
Moulmein	C	61	83	35	35	6	8	7		5	4	6	3	2	5	4	1	
Negapatam	C	2		3	1													
Northwest Frontier Province	C	50	1	21	11		5		11	7		4	4					7
Punjab	C	641	457	372	377	77	73	92	78	48	9	26	30	9	14	8	4	
Rangoon	C	10	16	20	4	5		71	1	1				2		2		[2]1
Sind State	C			90	249	72	17	65	42	4	11	27	12	10	10	1	1	6
Vizagapatam	C	39	19	2	5		1		1					1			1	
India (French):																		
Chandernagor Territory	C	239		29	10			6	2									
Karikal Province	C			2														
Pondichery Province	C	4		2	2						6							
	D			2	1						2							
India (Portuguese)	C		9															
Indochina (see also table below):																		
Haiphong	C	1																
Pnom-Penh	C							1				1			1			
Saigon	C			1														
Tourane	C		1	1	1													
Iran	C	12	1			1	4	1	1		1			4				

[1] For 2 weeks.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936 6	June 13	June 20	June 27	July 1936 4	July 11	July 18	July 25	August 1936 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29
Iraq	C	40	9	10	11		1								1			
Baghdad	C			2	1										1			
Basra	C			3														
Japan:																		
Kobe	C			1														
Moji	C	1	1															
Nagasaki	C			1														
Osaka	C		5		1				1	1		1			2	1	[illegible]	5
Yokohama	C				1													
Mexico (see also table below):																		
Chihuahua	C	1		2	2			2										
Guadalajara	D	46	39	33	21	1		3	2	1	1		1	1	1			
Mazatlan	C	1	2															
Mexico, D. F.	C	11	12	29	23		4	5	6	3	2	2		6				
Monterrey	C	2	2	1														
San Luis Potosi	D		1															
Torreon	C		2									1	2					
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	549	1,697	503	427	27			[2] 1,001									
Lagos	C	2																
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C	70	43															
Peru. (See table below.)																		
Poland	C	1																
Portugal (see also table below):																		
Lisbon	C	[illegible]	5	3	1							1	1	1	[illegible]			
Oporto	C						1							1				
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C	5		12	6													
Sierra Leone	C	135	225	3	9	11		14		7								
Freetown	C	1		1	2													

Spain	C	12	15	24	12		21		2									
Straits Settlements: Singapore	C							[2] 1										
Sudan (Anglo-Egyptian)	C	5	12	6	17			4	1				1		12	1		
Turkey. (See table below.)																		
Union of South Africa	C									1			P					

On vessels:		
S. S. *Khosrou* at Kamaran quarantine station	1 case	Feb. 15, 1936
S. S. *Karapara* at Rangoon from Calcutta	1 case	Mar. 9, 1936
S. S. *Egra* at Calcutta	1 case	Mar. 10, 1936
S. S. *City of Aukland* at Rangoon from Calcutta	2 cases	Mar. 15, 1936
S. S. *Khandalla* at Rangoon from Calcutta	1 case	Mar. 16, 1936
S. S. *Haishang* at Rangoon	1 case	Mar. 18, 1936
S. S. *Cranfield* at Madras from Calcutta	1 case	Mar. 27, 1936
S. S. *Hokuryo Maru* at Moji from Tientsin	1 case	Apr. 2, 1936
S. S. *City of Adelaide* at Colachel from Rangoon	1 case	Apr. 13, 1936
On vessels—Continued.		
S. S. *Egra* at Rangoon from Calcutta	1 case	Apr. 13, 1936
S. S. *City of London* at Suez from Calcutta	1 case	Apr. 20, 1936
S. S. *Manipura* at Port Sudan from Calcutta	1 case	Apr. 23, 1936
S. S. *Kasagi Maru* at Moji from Shanghai	1 case	May 4, 1936
S. S. *Ikuji Maru* at Nagasaki from Dairen	1 case	May 8, 1936
S. S. *Bhutan* at Kobe from Shanghai	5 cases	May 13, 1936
S. S. *Jinkai Maru* at Moji from Hongay	1 case	June 1, 1936
S. S. *Ronna* at Penang from Madras	1 case	June 11, 1936
S. S. *Maya Maru* at Moji from Shanghai	2 cases	June 15, 1936

Place		February 1936	March 1936	April 1936	May 1936	June 1936	July 1936
Angola	C	12	30	29			
Argentina (see also table above):							
Buenos Aires Province	C	4		7	12		
Entre Rios Province	C	5	1				
Jujuy Province	C		7	3	3	9	6
Belgian Congo	C	227	198	135	75	185	
Bolivia	C	18	62	15	31	8	
China: Manchuria—Harbin	C	3			7		
Chosen	C	245	345	313	183	84	
Colombia (see also table above):							
Barranquilla	D	1	1			1	
Santa Marta	D	1					
Dahomey	C	18	11				
Ecuador: Guayaquil	C	1					
France	C	24	30				36
Guatemala	C	14	2	5	1	3	5
Indochina (see also table above)	C	229	196	221	142	78	93
	D	31	15	30	19	10	8
Mexico (see also table above):							
Aguascalientes State—							
Aguascalientes	C	5	4	4	2		
Chihuahua State—Chihuahua	C		1				
Coahuila State—Torreon	C	1					
Colima State	C	1	1				
Mexico—Continued							
Guanajuato State	C		5				
Jalisco State—Guadalajara	C	115	70	39	57		
	D	50	43	34	56		
Lower California	C	7			1		
Mexico State	C	2	4	6	4		
Mexico, D. F.	C	22	18	13			
Mexico City	C				26		
Morelos State	C		1				
Puebla State	C	9	2				
Puebla	C	8	2	1	2		
Quintana Roo	C		1				
San Luis Potosi State—San Luis Potosi	C		8				
Sonora State	C	1	1	1			
Tlaxcala State	D		1				
Morocco	C	1	2	15	6	3	
Mozambique	C	1	2	5			
Nyasaland	C	50	1	3			
Peru	C	7	21	30	10		
Portugal (see also table above)	C		49	16	24	39	
	D		8		2	5	
Salvador	C	46	13	39	18		
Turkey	C	6	1	1	16		16

[2] Imported.

[3] For 3 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended— May 1936 2	9	16	23	30	June 1936 6	13	20	27	July 1936 4	11	18	25	August 1936 1	8	15
Algeria:																				
Algiers Department	C	31	64	77	21	11	38	2	8	3		74	8	12	16	24	21	[illegible]	4	10
Algiers	C						2	1	1	1		2							1	
Constantine Department	C	60	49	62	5	34	8	9	5	3		14	5	9	22	[illegible]	[illegible]			2
Bone	C					1										2				
Constantine	C		1			2				1										
Philippeville	C									1										
Oran Department	C	53	12	32		5	7					6	2	1						1
Australia: Sydney	C					1														
Basutoland	C		3		1	4	8	5												
Bolivia. (See table below.)																				
Bulgaria	C	11		47																
Chile	C	436	235		[2] 199						[3] 248									
Valparaiso	C	29	8	12				1	1	5	1			1	1					1
China:																				
Hankow	C		1	3				2		1			4	1						
Nanking	C			1										1						
Shanghai	C				1		1	1		3	4	1								
Tientsin	C	1	1	1		1		3		2		2				[illegible]				
Tsingtao	C	1	1						[illegible]											
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C		[illegible]	1			1							[illegible]						1
Asyut Province	C	[illegible]	[illegible]	1			2													1
Beheira Province	C	[illegible]	[illegible]	[illegible]			[illegible]													
Cairo	C	[illegible]	[illegible]	[illegible]	5	1		2			1									
Dakahliya Province	C	[illegible]	14	[illegible]			15													
Faiyum Province	C																			
Gharbiya Province	C	[illegible]	[illegible]	23			22			[illegible]										
Girga Province	C			1											1					
Minufiya Province	C	[illegible]	[illegible]				2			2					1				2	
Port Said	C						1													

Sharkiya Province	C	1	13				2									7			3	1
Suez	C												1						1	
Provinces	C	371	372	563	109	101	107	106	98	93	72	76	95	80	21	20	14	8	14	5
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	9	24	4	1	1	1	1	1	1	1	1	1	1					1	1
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C		7			1									1	1	1		1	
Hungary	C		7	4	1															
Iran	C	9	9	25	5	6	2	7	1	5	6	4	2	8				4		
Teheran	C		4	11												1				
Iraq	C												1							
Irish Free State:																				
Galway County:																				
Bothar Buidhe	C												1		1					
Oughterard	C														1	1				
Kerry County [4]																				
Mayo County	C			2	1															
Latvia. (See table below.)																				
Lithuania	C	9	13	10			4			2	9									
Mexico (see also table below):																				
Mexico, D. F	C	71	42	44	5	8	2	9	9		3	7	3	3	4	7		4		
San Luis Potosi	D	1										1					1			
Torreon	C											1			1					
Morocco (see also table below)	C	37	5	39	5	13	4	1	5	2		3	2	2	4				1	
Palestine:																				
Haifa	C	2		1				7	1	2	1	[1] 9	1	[5] 2	1	1	2	4	1	3
Jaffa	C																5			5
Panama Canal Zone. (See table below.)																				
Peru. (See table below.)																				
Poland	C	671	619	519	148	139	104	110	86	89	85	45	33	51	44	27	14	22	10	3
	D	45	39	29	5	11	7	4	5	3	4	3	5	1	3	4	3			
Portugal (see also table below): Oporto	C		1																	
Rumania. (See table below.)																				
Spain: Catalonia	C													1						
Straits Settlements: Singapore	C		2	1											2		1			
Syria: Beirut	C	[3] 2																		
Trans-Jordan	C	11	6	10																
Tunisia:																				
Tunis	C		9	4	1	1		1			2		1			1	1		1	
Provinces	C	64	138	127	27	18	29	22	18	10	21		18	7	17	7	9	7	11	
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Rotterdam from Algiers	C						1													

[1] For 2 weeks.
[2] For 5 weeks.
[3] For 6 weeks.
[4] During the week ended Aug. 29, 1936, 2 cases of typhus fever were reported in Dingle, Kerry County, Irish Free State.
[5] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYHUS FEVER—Continued

C indicates cases; D, deaths; P, present]

Place		February 1936	March 1936	April 1936	May 1936	June 1936	July 1936
Bolivia	C	115	110	75	33	46	
China: Manchuria—Harbin	C	5	9		33	29	15
Chosen	C	126	259	312	225		
Czechoslovakia	C	25	219	99	49	23	
Finland	C		5	112	10		
Greece (see also table above)	C	7	8	5	3	4	3
Guatemala	C	17	6	114	116	59	30
Latvia	C		5				
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	5	5	5	5		
Durango State	C	1	1				
Guanajuato State	C		58	2			
Leon	C	16	20				
Mexico State	C	2	15	6	6		
	D	3			2		
Mexico, D. F.	C	73	52	40			
Mexico City	C			20	26		
	D				15		
Oaxaca State	C	2					
Mexico (see also table above)—Con.							
Puebla State: Puebla	C	2	3	3	3		
Queretaro State	C				1		
San Luis Potosi State: San Luis Potosi	C	6	6	5	3		
Tlaxcala State	C		1				
Morocco (see also table above	C	39	7	45	[illegible]	9	6
Panama Canal Zone	C	1	1			2	
Peru	C	103	115	[illegible]	[illegible]		
Portugal (see also table above)	C	1	[illegible]	[illegible]		1	
Rumania	C	905	1,841	[illegible]	[illegible]	[illegible]	
Turkey	C	51	51	[illegible]	[illegible]	[illegible]	[illegible]
Istanbul	C	4	4	[illegible]	[illegible]	[illegible]	2
Union of South Africa:							
Cape Province	C	57	[illegible]	[illegible]	[illegible]	[illegible]	
Natal	C	2	[illegible]	[illegible]	[illegible]	1	
Orange Free State	C	21	[illegible]	[illegible]	[illegible]	4	
Transvaal	C	13	3	[illegible]		[illegible]	
Yugoslavia	C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	53

YELLOW FEVER

Place		Jan. 26–Feb. 29, 1936	Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Week ended— May 1936					June 1936				July 1936				August 1936			
					2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22
Bolivia: Santa Cruz Department.[1]																					
Brazil:[2]																					
Amazonas State	C		1		1		1	1													
Maranhao State	C								1												
Matto Grosso State	C	2	1	2								1									
Minas Geraes State	C	12	7	2	1			3	1	1											
	D	11	7	2	1			3	1	1											
Parana State [2]	C	9	12	3																	
Sao Paulo State [2]	C	23	35	[3] 3	1	1	6	6	2	2	3	1									
Colombia:																					
Boyaca Department	C	3																			
Intendencia of Meta	C	3																			
Dahomey	C														[4] 1						
Gold Coast:																					
Koforidua	C			1																	
Kumasi	C	1	1																		
Peprawase	C			1																	
Ivory Coast: Vavua	C			1																	
Nigeria: Kano	C																				[4] 1
Niger Territory: Fada N'Gourma	C			1																	
Senegal:																					
Thies	C											1									
Tivaouane [5]	C									1	1										
Sudan (French): Kayes	C													[4] 1							

[1] Yellow fever has been reported in Santa Cruz Department, Bolivia, as follows: For the month of February, 2 cases; March, 10 cases; April 1 case; May, 1 case; June, 2 cases.
[2] Yellow fever has also been reported in Brazil as follows: Parana State, Feb. 16–25, 1936, 5 cases, 5 deaths; Sao Paulo State, no date given, 3 cases and 4 deaths. Mar. 24–31, 1936, 2 cases, 2 deaths
[3] Includes 1 case of yellow fever reported in the city of Sao Paulo, Brazil.
[4] Suspected.
[5] During the week ended Sept. 12, 1936, 1 case of yellow fever was reported in Tivaouane, Senegal.

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Quarantinable and Other Diseases in Foreign Countries

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 OCTOBER 2, 1936 NO. 40

THE NOTIFIABLE DISEASES IN THE UNITED STATES, 1935

There is presented here a summary showing the prevalence of the most important communicable diseases in 1935 as reported by the health officers of the several States and the District of Columbia. It is taken from Supplement No. 119 to the PUBLIC HEALTH REPORTS, which presents the data more in detail, giving the total for each disease by months and cases and deaths by States.

The following is a list of the diseases included in the Supplement:

Typhoid fever (1) and paratyphoid fever (2)
Typhus fever (3)
Undulant fever (5)
Smallpox (6)
Measles (7)
Scarlet fever (8)
Whooping cough (9)
Diphtheria (10)
Influenza (11)
Cholera (12)
Dysentery (amoebic) (13a)
Plague (14)
Poliomyelitis (16)
Epidemic encephalitis (17)
Meningococcus meningitis (18)
Anthrax (20)
Rabies in animals
Rabies in man (21)
Tuberculosis (respiratory system and all forms) (23 32)
Syphilis (34)
Gonorrhea (35)
Yellow fever (37)
Malaria (38)
Chicken pox (44a)
Dengue (part 44c)
Mumps (part 44c)
Rocky Mountain spotted fever (part 44c)
Tularaemia (part 44c)
Pellagra (62)
Pneumonia (all forms) (107 109)
Septic sore throat (115a)

Morbidity data for 1935 were received from all the States and the District of Columbia. Mortality data were received from all States (including the District of Columbia), except New Hampshire, Ohio, and North Dakota.

The populations given and used in computing case and death rates were estimated as of July 1, 1935, by the Bureau of the Census.

The estimated expectancy, given in this summary for some of the diseases, is the result of an attempt to ascertain from the experience of recent years how many cases of the disease under consideration might be expected in 1935. It is the median number of cases reported for the years 1928 to 1934, inclusive.

In comparing the figures for 1935 with the estimated expectancy, or with reports for preceding years, it should be borne in mind that there has been a gradual improvement in the reporting of notifiable

(Figures in parentheses refer to International List of Causes of Death.)

diseases. An increase in the number of cases reported may be due in some instances to better reporting of the particular disease rather than to an increase in the number of cases occurring.

SUMMARY OF NOTIFIABLE DISEASES IN THE UNITED STATES, 1935

TYPHOID FEVER (1) AND PARATYPHOID FEVER (2)

45 States [1]	
Cases reported, 1935 (population 119,612,000)	17,595
Estimated expectancy based on years 1928-34	22,[illegible]
Cases per 1,000 inhabitants, 1935	0.147
Cases per 1,000 inhabitants, estimated expectancy	0.193
Deaths registered, 1935	3,325
Deaths per 1,000 inhabitants, 1935	0.028
Cases reported for each death registered, 1935	5
48 States [1]	
Cases reported, 1935 (population 127,521,000)	18,355
Cases per 1,000 inhabitants, 1935	0.144

SMALLPOX (6)

45 States [1]	
Cases reported, 1935 (population 119,612,000)	7,976
Estimated expectancy based on years 1928-34	[illegible]
Cases per 1,000 inhabitants, 1935	0.066
Cases per 1,000 inhabitants, estimated expectancy	0.171
Deaths registered, 1935	23
Deaths per 1,000 inhabitants, 1935	0.0002
Cases reported for each death registered, 1935	3[illegible]2
48 States [1]	
Cases reported, 1935 (population 127,521,000)	7,957
Cases per 1,000 inhabitants, 1935	0.062

MEASLES (7)

45 States [1]	
Cases reported, 1935 (population 119,612,000)	701,551
Cases per 1,000 inhabitants, 1935	5.8[illegible]
Deaths registered, 1935	3,495
Deaths per 1,000 inhabitants, 1935	0.029
Cases reported for each death registered, 1935	202
48 States	
Cases reported, 1935 (population 127,521,000)	743,856
Cases per 1,000 inhabitants, 1935	5.833

SCARLET FEVER (8)

45 States [1]	
Cases reported, 1935 (population 119,612,000)	233,153
Estimated expectancy based on years 1928-34	167,675
Cases per 1,000 inhabitants, 1935	1.949
Cases per 1,000 inhabitants, estimated expectancy	1.4[illegible]3
Deaths registered, 1935	2,355
Deaths per 1,000 inhabitants, 1935	0.020
Cases reported for each death registered, 1935	99
48 States [1]	
Cases reported, 1935 (population 127,521,000)	2[illegible],962
Cases per 1,000 inhabitants, 1935	2.016

WHOOPING COUGH (9)

45 States [1]	
Cases reported, 1935 (population 119,612,000)	172,[illegible]
Estimated expectancy based on years 1928-34	168,[illegible]
Cases per 1,000 inhabitants, 1935	1.442
Cases per 1,000 inhabitants, estimated expectancy	1.[illegible]
Deaths registered, 1935	[illegible]
Deaths per 1,000 inhabitants, 1935	0.036
Cases reported for each death registered, 1935	40
48 States [1]	
Cases reported, 1935 (population 127,521,000)	180,518
Cases per 1,000 inhabitants, 1935	1.416

DIPHTHERIA (10)

45 States [1]	
Cases reported, 1935 (population 119,612,000)	36,561
Estimated expectancy based on years 1928-34	57,750
Cases per 1,000 inhabitants, 1935	0.306
Cases per 1,000 inhabitants, estimated expectancy	0.497
Deaths registered, 1935	3,620
Deaths per 1,000 inhabitants, 1935	0.030
Cases reported for each death registered, 1935	10
48 States [1]	
Cases reported, 1935 (population 127,521,000)	39,220
Cases per 1,000 inhabitants, 1935	0.308

[1] The District of Columbia is also included.

SUMMARY OF NOTIFIABLE DISEASES IN THE UNITED STATES, 1935—continued

INFLUENZA (11)

34 States: [1]	
Cases reported, 1935 (population 81,380,000)	191,868
Cases per 1,000 inhabitants, 1935	2.358
Deaths registered, 1935	20,712
Deaths per 1,000 inhabitants, 1935	0.255
Cases reported for each death registered, 1935	9
37 States: [1]	
Cases reported, 1935 (population 89,289,000)	195,553
Cases per 1,000 inhabitants, 1935	2.190
45 States: [1]	
Deaths registered, 1935 (population 119,612,000)	26,302
Deaths per 1,000 inhabitants, 1935	0.220

DYSENTERY (AMOEBIC) (13A)

25 States:	
Cases reported, 1935 (population 82,280,000)	1,562
Cases per 1,000 inhabitants, 1935	0.019
Deaths registered, 1935	167
Deaths per 1,000 inhabitants, 1935	0.002
Cases reported for each death registered, 1935	9
28 States:	
Cases reported, 1935 (population 94,318,000)	1,613
Cases per 1,000 inhabitants, 1935	0.017
42 States. [1]	
Deaths registered, 1935 (population 110,652,000)	212
Deaths per 1,000 inhabitants, 1935	0.002

POLIOMYELITIS (16)

45 States: [1]	
Cases reported, 1935 (population 119,612,000)	10,671
Estimated expectancy based on years 1928-34	3,610
Cases per 1,000 inhabitants, 1935	0.089
Cases per 1,000 inhabitants, estimated expectancy	0.031
Deaths registered, 1935	914
Deaths per 1,000 inhabitants, 1935	0.008
Cases reported for each death registered, 1935	11
48 States: [1]	
Cases reported, 1935 (population 127,521,000)	10,839
Cases per 1,000 inhabitants, 1935	0.085

EPIDEMIC ENCEPHALITIS (17)

29 States: [1]	
Cases reported, 1935 (population 81,471,000)	955
Cases per 1,000 inhabitants, 1935	0.011
Deaths registered, 1935	506
Deaths per 1,000 inhabitants, 1935	0.006
Cases reported for each death registered, 1935	2
30 States: [1]	
Cases reported, 1935 (population 91,178,000)	970
Cases per 1,000 inhabitants, 1935	0.011
45 States: [1]	
Deaths registered, 1935 (population 119,612,000)	693
Deaths per 1,000 inhabitants, 1935	0.006

MENINGOCOCCUS MENINGITIS (18)

41 States: [1]	
Cases reported, 1935 (population 115,175,000)	5,277
Estimated expectancy based on years 1928-34	4,016
Cases per 1,000 inhabitants, 1935	0.046
Cases per 1,000 inhabitants, estimated expectancy	0.036
Deaths registered, 1935	2,139
Deaths per 1,000 inhabitants, 1935	0.019
Cases reported for each death registered, 1935	2
43 States: [1]	
Cases reported, 1935 (population 122,582,000)	5,736
Cases per 1,000 inhabitants, 1935	0.047
44 States: [1]	
Deaths registered, 1935 (population 117,600,000)	2,236
Deaths per 1,000 inhabitants, 1935	0.010

TUBERCULOSIS (RESPIRATORY SYSTEM) (23)

43 States: [1]	
Deaths registered, 1935 (population 115,600,000)	57,366
Deaths per 1,000 inhabitants, 1935	0.496

TUBERCULOSIS (ALL FORMS) (23-32)

45 States: [1]	
Deaths registered, 1935 (population 119,612,000)	65,237
Deaths per 1,000 inhabitants, 1935	0.545

[1] The District of Columbia is also included.

SUMMARY OF NOTIFIABLE DISEASES IN THE UNITED STATES, 1935—continued

SYPHILIS (30)

45 States.[1]	
Cases reported, 1935 (population 126,6[illegible],000)	2[illegible]9,314
Cases per 1,000 inhabitants, 1935	2.017
45 States.[1]	
Cases reported, 1935 (population 126,6[illegible],000)	163,691
Cases per 1,000 inhabitants, 1935	1.292

MALARIA (38)

36 States	
Cases reported, 1935 (population 108,162,000)	137,389
Cases per 1,000 inhabitants, 1935	1.270
Deaths registered, 1935	4,207
Deaths per 1,000 inhabitants, 1935	0.039
Cases reported for each death registered, 1935	33
37 States.	
Cases reported, 1935 (population 114,869,000)	137,502
Cases per 1,000 inhabitants, 1935	1.197
45 States.[1]	
Deaths registered, 1935 (population 119,612,000)	4,310
Deaths per 1,000 inhabitants, 1935	0.036

CHICKEN POX (114)

44 States.[1]	
Cases reported, 1935 (population 113,535,000)	248,823
Estimated expectancy based on years 1928-34	216,571
Cases per 1,000 inhabitants, 1935	2.192
Cases per 1,000 inhabitants, estimated expectancy	1.909
Deaths registered, 1935	141
Deaths per 1,000 inhabitants, 1935	0.001
Cases reported for each death registered, 1935	1,765
48 States.[1]	
Cases reported, 1935 (population 127,521,000)	273,863
Cases per 1,000 inhabitants, 1935	2.148

MUMPS (PART 110)

41 States:	
Cases reported, 1935 (population 98,073,000)	111,734
Estimated expectancy based on years 1928-34	87,117
Cases per 1,000 inhabitants, 1935	1.139
Cases per 1,000 inhabitants, estimated expectancy	0.916
Deaths registered, 1935	74
Deaths per 1,000 inhabitants, 1935	0.001
Cases reported for each death registered, 1935	1,960
45 States.	
Cases reported, 1935 (population 107,994,000)	150,658
Cases per 1,000 inhabitants, 1935	1.161
44 States.[1]	
Deaths registered, 1935 (population 117,600,000)	83
Deaths per 1,000 inhabitants, 1935	0.001

PELLAGRA (63)

45 States.[1]	
Deaths registered, 1935 (population 119,612,000)	3,178
Deaths per 1,000 inhabitants, 1935	0.026

PNEUMONIA (ALL FORMS) (107 109)

22 States:[1]	
Cases reported, 1935 (population 58,155,000)	90,114
Cases per 1,000 inhabitants, 1935	1.512
Deaths registered, 1935	17,655
Deaths per 1,000 inhabitants, 1935	0.815
Cases reported for each death registered, 1935	2
44 States.[1]	
Deaths registered, 1935 (population 115,237,000)	91,136
Deaths per 1,000 inhabitants, 1935	0.810

SEPTIC SORE THROAT (115A)

25 States:	
Cases reported, 1935 (population 57,833,000)	4,127
Cases per 1,000 inhabitants, 1935	0.071
Deaths registered, 1935	763
Deaths per 1,000 inhabitants, 1935	0.013
Cases reported for each death registered, 1935	5
32 States:	
Cases reported, 1935 (population 79,305,000)	7,206
Cases per 1,000 inhabitants, 1935	0.091
[illegible]	
Deaths registered, 1935 (population 95,681,000)	1,985
Deaths per 1,000 inhabitants, 1935	0.021

[1] The District of Columbia is also included.

RESISTANCE OF VARIOUS STRAINS OF E. TYPHI AND COLI AEROGENES TO CHLORINE AND CHLORAMINE[1]

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From the time of the meeting in 1895 (1) of the first committee appointed by the American Public Health Association to investigate water bacteriology, continuous attempt at improvement of the bacteriological methods of examination of water has been made. Since 1905 (2) when the first "Standard Methods of Water Analysis" was issued by the American Public Health Association, *B. coli* has been used as an indicator of the bacteriological condition of a water supply. In 1912 (3), 1917 (4), 1920 (5), 1923 (6), 1925 (7), and 1933 (8), new editions, with various changes, were issued. In 1914 the United States Treasury Department, in first establishing standards for drinking and culinary water supplied by common carriers in interstate commerce, included a section relating to bacteriological quality which establishes the allowable limits of impurity as measured by the concentration of organisms of the *B.* (*Escherichia*) *coli* group. Since 1925 the standards have also included sections relating to the source and protection, and to physical and chemical characteristics. There is still a great diversity of opinion among workers as to the media most suitable for demonstration of the *coli-aerogenes* group. There is also much argument as to whether present tests are sufficiently sensitive. In early work, dextrose broth, as well as other media, was used. In the 1912 edition of "Standard Methods" lactose bile broth was recommended as the medium of choice in case only one medium was used for the presumptive test for *B. coli*. In this same edition, methods of isolating *B. typhosus* from water are given, but these were removed in the next edition. At present the official medium for the presumptive test for *coli-aerogenes* is lactose broth, using 48 hours' incubation. It is of interest that Norton, at the 1929 (9) session of the American Public Health Association, stated that "*B. coli* may be completely killed in 48 hours in lactose broth media." This statement indicates the possibility that members of the *coli-aerogenes* group may be present in a water although the presumptive test may fail to demonstrate their presence. Winslow (10) and others have suggested that lactose bile broth and lactose broth both be used for the presumptive test. Other workers feel that the amount of water should be markedly increased over the present total of 50 cc.

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[1] This work was done under the direction of Dr. O. McDaniel, Director, Division of Preventable Diseases, and Mr. H. A. Whittaker, Director, Division of Sanitation, Minnesota State Department of Health.

Space does not permit the giving of more than a few salient points in the early development of knowledge which led to the use of *B. coli* as a means of indicating the bacteriological safety of water.

The difficulty of isolating *B. typhosus* from water was early realized. Laws and Andrewes (11), 1891, failed to isolate this organism from London sewage. Difficulty was also encountered in isolating the organisms from polluted wells by Kübler and Neufeld (12), 1899, Fischer and Flatau (13), 1901. Jordan, Russell, and Zeit (14), 1904, showed that *B. typhosus* placed in colloidin sacs in the Chicago River and Lake Michigan lived only a few days. It was also shown experimentally by Franklin (15), 1891, that the number of *B. typhosus* is rapidly reduced in water. Jordan (16), 1895, showed that *B. typhosus* gradually died out in a potable water, while *B. coli* at first multiplied rapidly and lived as a rule much longer. However, it is of interest that Jordan found that when the typhoid strain with which he worked was recently isolated, it lived as long as 93 days in potable water, whereas its viability dropped gradually after being in artificial media, until at 13 months it lived only about 12 to 13 days. In distilled water, freshly isolated *B. typhosus* lived only 18 days at the longest. *B. coli* lived as long as 262 days in potable water, but there was variation in the different strains, some strains being viable only a little longer than freshly isolated *B. typhosus*. This work which showed clearly the much greater viability of recently isolated in comparison to old typhosus strains has apparently been neglected.

Even before any of the above work, Smith (17), 1892, suggested a plan to the New York State Board of Health for estimation of colon bacilli in water. Early studies of significance also were those of the Massachusetts State Board of Health, 1898 (18), 1899 (19), 1900 (20), and 1901 (21), Clark and Gage (22), 1900, and Jordan (23), 1901. By 1903-4 the significance of *B. coli* in drinking water was quite well established. The statement of Prescott and Winslow (24), in 1904, in their book "Elements of Water Bacteriology", seems to voice the general opinion of that day: "Altogether the evidence is quite conclusive that the absence of *B. coli* demonstrates the harmlessness of a water as far as bacteriology can prove it. That when present, its numbers form a reasonably close index of the amount of pollution." They cited several authors whose investigations seemed to prove the point of the above quotation "beyond reasonable cavil."

When disinfectants began to be used in treating water supplies it was apparently considered that *B. coli* was more resistant to various chemicals than were the pathogenic intestinal bacteria. However, there is very little information in the literature on this subject. Wesbrook, Whittaker, and Mohler (25), in 1910, studied the resistance of six strains of *B. typhosus* and *B. coli* to calcium hypochlorite. The *B. coli* and *B. typhosus* strains had been from 1 month to approxi-

mately 18 months on artificial media. Mississippi River water, rendered bacteria-free by passage through a filter, was used as a menstruum. Varying amounts of hypochlorite solution were added to the suspension of bacteria in water kept at room temperature during the experimental work. Agar plates were made at set intervals and incubated at 37° C. for 24 hours, and counts were made. These investigators found that different amounts of chemicals were required to sterilize different cultures and strains of both colon and typhoid bacilli. In 2 out of 12 experiments more chemical was required to produce sterility in the *typhosus* than in the *coli* suspension. The minimum amount of chemical required in the minimum time tested for *B. coli* was from 1.5 to 3 + P. P. M., for *B. typhosus* from 1 to 3 parts per million of available chlorine. The authors were of the opinion that their results indicated in a very general way that the use of the presence or absence of *B. coli* in a water supply as a guide to the possible presence or absence of typhoid infection might be warranted pending the formulation of better technical methods. They recommended further investigation "to determine the effect of the variable factors responsible for variations in efficiency of sterilization procedures" and suggested that "the final check, however, on the value of the colon test in water disinfection will be the epidemiological data collected on typhoid infected water supplies before and after treatment."

Tonney, Greer, and Danforth (26), 1928, and Tonney, Greer, Frank, and Liebig (27), 1930, studied the minimal "Chlorine death points" of 503 vegetative and spore-bearing strains of bacteria (48 species) among which were 21 strains of *B. typhosus*, 33 of *B. coli*, and 41 of *B. aerogenes*. The authors do not give a history of the strains used or any idea of how long they had been on artificial media. Using distilled water as a menstruum, they found that exposure for 15 to 30 seconds to 0.1 P. P. M. chlorine was sufficient to kill all the *B. typhosus*, while 13 strains of *B. coli* were killed by 0.15 P. P. M., 10 strains by 0.20 P. P. M., and 9 strains by 0.25 P. P. M. of chlorine when exposed for the same period of time. The results with *B. aerogenes* were similar to those with *B. coli*. They concluded: "The experiments appear to furnish a satisfactory theoretical basis for the current practice of relying on the consistent destruction of *B. coli* in water as a criterion of effective chlorination." Griffin (28), 1934, states that 99 percent or more of *B. coli* in average water are killed within 15 minutes, and that for a given time of contact chloramine residuals two times greater than chlorine residuals will accomplish approximately the same results. Beard and Kendall (29), 1935, state: "At all organic loads the chloramine sterilization was better in 30 minutes than chlorine sterilization in 60 minutes." The apparent lack of agreement as to the relative killing power of chlorine and

chloramine is as yet unexplained. Possibly it is explainable on the basis of the difference in the chemical characteristics of the water used, the peculiarities of the organisms involved, or other similar factors.

Since there is little, if any, comparative data on the resistance of freshly isolated and older strains of *B. typhosus* and *coli-aerogenes* to the modern disinfectants used in the treatment of water supplies, employing city water as the diluent, the study [1] of this question seemed warranted. Some experimental data on this problem is reported below.

The authors wish to here state that nothing in this paper should be interpreted to mean that any bacteriological test is sufficient in itself as a criterion of safety of a water supply.

MATERIALS AND METHODS

The majority of the bacterial cultures used in this study were recently isolated local strains. A few were old laboratory strains which had been grown on artificial media for a number of years. The identification number, date of isolation, material from which isolated, and the duration of the patient's clinical condition at the time when the various strains were isolated are presented in the accompanying key.

The water used in the experiments to determine the killing power of chloramine was drawn from widely separated taps on the distribution system of the municipal water supply. Portions from different taps were mixed when necessary to obtain the desired chlorine residual. Only a negligible amount of nitrites, iron, or magnesium was present in any of the samples. The pH of the various waters ranged from 6.4 to 7.4.

In the preliminary experiments, the killing power of chloramine was determined at room temperature, in three chlorine residual ranges for only one organism at a time. For each day's experiment 400 cc of each water sample was placed in three sterile 500-cc Erlenmeyer flasks, respectively. A portion of a 24-hour broth culture of either *E. typhosa* or a member of the *coli-aerogenes* group was then added to each of the three flasks. The initial number of the bacteria in the resulting suspension ranged from 80 to 850 per cc. At the end of 5, 15, and 30 minutes, and 1, 1½, 2, and 18 hours, two 1-cc portions were removed from each flask and plated in brom-cresol purple lactose agar. The plates were incubated at 37° C. for 48 hours, at the end of which time the colonies were counted. The residual chlorine concentration was determined by the ortho-tolidine method at the beginning and at intervals throughout the course of the experiment.

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[1] This study was suggested in the course of an investigation of a typhoid fever epidemic in Minneapolis, Minn., during the summer of 1935, the investigation having been made possible through special grant by the State Executive Council

Key to bacterial strains used in the experiments to determine the killing power of chloramine and chlorine for E. typhosa and the coli-aerogenes group

Organism		Ident. no.	Organism isolated: Date 1935	Organism isolated: From—	Duration of patient's clinical condition when specimen was collected
E. typhosa		1679	July 25	Feces	41 days.
		1727	July 26	Urine	8 days.
		1560	July 30	do	12 days.
		2547	Sept. 6	Feces	47 days. (Same patient as 1727.)
		823	Sept. 9	do	Carrier. No history of typhoid.
		2023	Sept. 10	do	27 days. Same patient.
		883	Sept. 19	do	38 days. Same patient
		8120	Oct. 2	do	Carrier. No history of typhoid.
		3080	Oct. 5	do	35 days.
		3539	Oct. 28	do	31 days.
		8209	Nov. 8	do	66 days.
		3802	Nov. 12	do	14 days.
		M711	Nov. 18	Bl culture	21 days.
		T5, old laboratory strain. In this division since 1913.			
		Rawlings old laboratory strain.			
Coli-aerogenes group	*E. communior* (Bergey).	1845	July 28	Urine	Routine stool and urine examination.
		837	Sept. 10	Feces	Do.
		849	Sept. 13	do	Do.
		853	do	do	Do.
		2830	Sept. 23	do	Do.
	E. coli (Bergey)	8217	Nov. 8	Feces	Routine stool and urine examination.
	Coli-aerogenes intermediates.[1]	47991A	July 7	Tap water	Routine water examination.
		48451A	July 29	do	Do.
		48609A	Aug. 5	do	Do.
		48760A	Aug. 10	do	Do.
		49565C	Aug. 22	do	Do.
		49816B	Aug. 27	do	Do.
	E. communior	Coli	Old laboratory strain (about 1931).		

[1] Physical and biochemical characteristics of the *coli-aerogenes* intermediate group:

Ident. no.	Gram.	Motil.	Dext.	Lact.	Sacc.	Man.	Indol.	Citrate	Met. red	Vog.-pros.	E. M. B.
47991A	−	+	A. G.	A. G.	A. G.	A. G.	−	+	+	−	Atypical.
48451A	−	−	A. G.	A. G	A. G.	A. G.	+	+	+	−	Do.
48609A	−	−	A. G.	A. G.	A. G.	A. G.	+	+	+	−	Do.
48760A	−	−	A. G.	A. G.	A. G.	A. G.	+	−	+	−	Typical.
49565C	−	−	A. G.	A. G	A. G.	A. G.	+	+	+	−	Do.
49816B	−	+	A. G.	A. G.	A. G.	A. G.	−	+	+	−	Do.

In the later experiments the killing power of chloramine was determined for a strain of *E. typhosa* and a member of the *coli-aerogenes* group simultaneously, both at room temperature and at that of iced water. In this series of experiments two ranges of chlorine residual were studied together. The following description applies to one chlorine residual range, since the two ranges were treated identically: For each day's experiment, 400 cc of the water was placed in each of four sterile 500-cc Erlenmeyer flasks. Two flasks were allowed to remain at room temperature and two were placed in iced water. One of the flasks at room temperature and one in the iced water were inoculated with a portion of a 24-hour broth culture of *E. typhosa*. The other two flasks were inoculated with a portion

of a 24-hour broth culture of a member of the *coli-aerogenes* group. The initial concentration of bacteria in the water suspensions was usually between 150 and 350 per cc. At 30-minute intervals up to 2½ hours, and again at the end of 18 hours, two 1 cc portions were withdrawn from each flask and plated in brom-cresol purple lactose agar. The plates were incubated and counted as previously described. The chlorine residuals were determined as before

The water for the experiments to determine the disinfecting action of chlorine was collected from the combined filter effluent at one of the city filtration plants. This water had been prechlorinated, but no ammonia had been added. The water was treat d by one of two methods: One method consisted of a preliminary treatment with concentrated chlorine water (700 p. p. m.) in an attempt to satisfy the chlorine demand, and a second treatment with chlorine the next morning 1 to 3 hours before use. In the other method a relatively large amount of concentrated chlorine water was added 2 to 4 hours before the experiment was begun. Only a trace of nitrites, iron, or magnesium was present in any of the samples. The pH values for the waters ranged from 7.0 to 7.9. This series of experiments included the simultaneous study of two bacterial strains in each of two chlorine residual ranges, and at both room temperature and that of iced water. The water was distributed into flasks and inoculated as previously described. At intervals of 5, 10, 20, and 30 minutes, and 1, 1½, 2, 2½, and 18 hours, two 1-cc portions were removed and plated. The plates were incubated and the colonies enumerated as before stated. The chlorine residuals were determined as above.

Another series of experiments included the simultaneous study of the killing power of both chloramine and chlorine for two bacterial strains at room temperature and at that of iced water. The chlorine residuals of the chloramine water and of the chlorine water were in the same range on any given day. The samples were collected and prepared as described above. The technique of the experiments was the same as that of the experiments to determine the disinfecting action of chlorine.

RESULTS

The results of the various experiments are shown in tables 1 to 4.[3]

From the results of the preliminary experiments (table 1), it will be seen that for the high chlorine residual ranges, 0.35–0.48 p. p. m., the recently isolated typhoid strains showed no colonies on the plates after an exposure of 30 minutes to 1 hour. The Rawlings strain of typhoid and the *coli-aerogenes* strains exhibited no colonies after 15 to 30 minutes' exposure.

[3] Tables not printed in the text will be found at the end of the article.—Ed.

Within the 0.18 0.25 p. p. m. chlorine residual range, the recently isolated typhoid strains showed no growth after an exposure of 1 to 1½ hours, while the Rawlings and the *coli-aerogenes* strains had no growth after an exposure of 30 minutes to 1 hour.

In the low chlorine residual range, 0.09 0.15 p. p. m., the recently isolated typhoid strains were often viable after exposure for 2 hours; however, the Rawlings and the *coli-aerogenes* strains showed no growth after 1½ hours' exposure.

The results of the experiments to determine the killing power of chloramine (table 2) show considerable variation. However, in the low chlorine residual range, 0.9 0.15 p. p. m., at room temperature, the recently isolated strains of *E. typhosa* and also the *coli-aerogenes* strains exhibited growth after exposure of from 2 to 2½ hours. Very often the *coli-aerogenes* strains showed no growth with a shorter period of exposure than did the strains of *E. typhosa.* Here again an old laboratory strain of *E. typhosa,* T5, showed no growth after a much shorter exposure, 30 minutes to 1 hour. In the chlorine residual range of 0.18 0.23 p. p. m. at room temperature the recently isolated strain of *E. typhosa* and the *coli-aerogenes* strains usually showed no growth after 1 to 1½ hours exposure. Frequently the recently isolated strains of *E. typhosa* were more resistant. The old laboratory strain of *E. typhosa,* T5, showed no growth after 1 hour's exposure. For the low residual range 0.9 0.15 p. p. m. in iced water, usually all the bacterial strains showed growth after 2½ hours' exposure. This was often true for the residual range of 0.18-0.23 p. p. m. also. In the other experiments at iced-water temperature with higher chlorine residuals there was little difference in the resistance of the strains of *E. typhosa* and those of the *coli-aerogenes* group. The thing that is at once noticeable is the much greater number of bacteria left after exposure at low temperatures than in those at room temperature.

In the results of the experiments to determine the killing power of chlorine (table 3), it will be seen that the low residual range 0.10-0.15 p. p. m. was relatively ineffective throughout. There were many more bacteria surviving after exposure in iced water than at room temperature. With the exception of T5, old laboratory strain of *E. typhosa,* all strains usually showed growth after 2½ hours' exposure. In the chlorine residual range of 0.18-0.25 p. p. m., exposure produces one of two results: In about one-half of the experiments the plates showed no growth when the first portion was removed for plating, after 5 to 30 minutes' exposure. This was true for all strains of *E. typhosa* and also for the *coli-aerogenes* group when exposed at both room temperature and at that of iced water. In the other half the killing power of chlorine was much less at low temperatures, and there were inconstant variations in the time required to produce sterile

plates both with *E. typhosa* strains and the members of the *coli-aerogenes* group.

When the killing power of chloramine and that of chlorine were studied simultaneously, the results (table 4) were little different from those obtained separately. The chlorine reacted in one of two ways: It produced very rapid disinfection in some experiments, and in the others there was little, if any, difference in the time required by chloramine and chlorine to produce sterile plates. Often the bacterial suspensions contained viable organisms after $2\frac{1}{2}$ hours' exposure, especially at low temperatures.

DISCUSSION AND SUMMARY

When the plate counts for the various periods of exposure in an experiment were plotted on semi-logarithmic paper it was found pos-

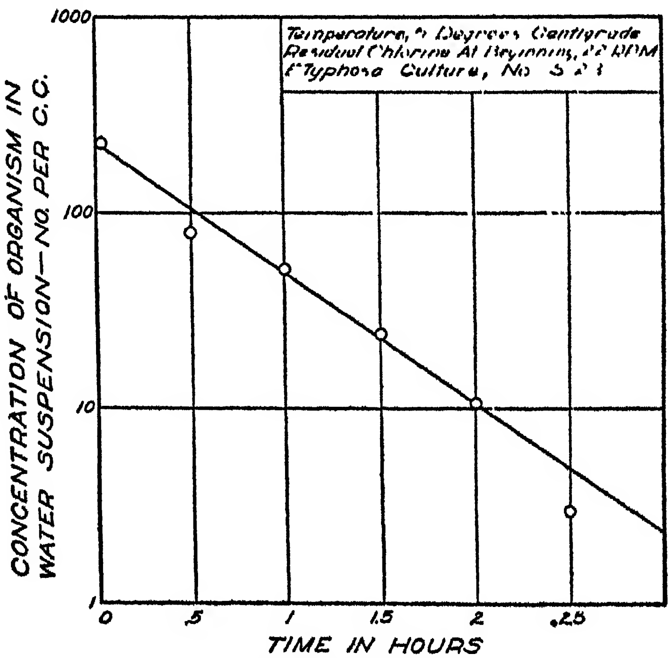

FIGURE 1.—Killing rate of chloramine

sible to project through the point representing the initial concentration a straight line which would pass through or close to practically all of the plotted points. Figure 1 shows the curve representing the killing power of chloramine (0.22 p. p. m.) for S 23 at 5° C.

It will be seen that all the plotted points do not lie on the line drawn. However, the points lie within the zone of experimental error. From the line slope as indicated on the resulting curve, the time required to kill 99.9 percent of the bacteria was computed.

Table 5 presents a summary of the preliminary experiments, including the results of these computations, together with the physical and chemical characteristics of each water. It is shown in this table and in tables 6 and 7 that the residual chlorine was reduced during the course of the experiments. It is obvious, then, that the value of the average acting residual lies somewhere between the initial and the terminal values. Sufficient chlorine readings were made during the course of the experiments to indicate that the decrease was gradual and that time and temperature were the principal factors governing the amount of depletion.

In the preliminary experiments it was found that a longer time was required to kill recently isolated strains of *E. typhosa* than to kill the old laboratory Rawlings strain. Also by comparing the time required to kill an old laboratory strain of *E. typhosa*, T5, with the time required to kill recently isolated strains under a given set of conditions, it was found that the recently isolated strains were, in general, more resistant to the disinfecting action of chloramine. This appears to indicate that prolonged growth on artificial media materially reduces the resistance of *E. typhosa* to the disinfecting action of chloramine.

In table 8, data taken from tables 5 and 6 which illustrate the above point are summarized.

TABLE 8.—*Resistances of recently isolated and of old laboratory strains of* E. typhosa *to the disinfecting action of chloramine*

Date	Initial Cl. residual p. p. m.	Strain no. of *E. typhosa*	Hours required to kill 99.9% of organisms: Room temperature	Hours required to kill 99.9% of organisms: Low temperature
August 10	0.00	Rawlings	1.76	
September 18	.09	2537	4.83	
October 11	.09	883	8.04	
October 17	.10	T5	5.26	12.31
September 30	.10	2623	8.38	28.7
July 31	.10	1727	6.05	
August 11	.12	Rawlings	3.10	
September 4	.12	1727	8.48	
October 8	.13	T5	5.0	6.58
October 15	.13	8120	6.38	9.98
August 14	.22	Rawlings	.54	
July 29	.2 .25	1679	2.82	
October 8	.23	T5	.813	2.21
October 17	.23	T5	1.71	4.18
October 7	.23	3080	3.73	7.20
October 11	.23	883	2.48	8.76
December 12	.25	3530	2.95	7.92
August 10	.35	Rawlings	.47	
September 3	.38	1560	1.76	

In table 6, which summarizes the results of experiments to determine the killing power of chloramine, it is shown that there were variations from day to day, even within the same chlorine residual and temperature ranges. These variations were to be expected, since the water used in these experiments was not a reproducible synthetic

water, but rather was taken from the municipal water-supply system and consequently was subject to the variations which occur in treated surface waters.

It is interesting to note that, at room temperature, the time required to kill recently isolated strains of *E. typhosa* was, in the majority of instances (29 out of 31), equal to or in excess of the time required to kill members of the *coli-aerogenes* group studied simultaneously. However, at low temperatures a longer time was required to kill members of the *coli-aerogenes* group than to kill the *E. typhosa* strains in slightly over half the experiments (18 out of 31.) These observations seem to indicate that some strains of *E. typhosa* may, under certain conditions, exhibit as great (or greater) resistance to the killing action of chloramine as do members of the *coli-aerogenes* group.

It was also observed that there was considerable variation in the time required to kill various members of the *coli-aerogenes* group. The variation of resistance exhibited, however, could not be used as a criterion to differentiate the strains of fecal origin from those obtained from water. The time required to kill any given organism was much greater at low temperature than at room temperature, often as much as 3 to 5 times as long. The increase in time required, however, appeared to be inconstant and unpredictable.

It is clearly demonstrated in tables 6, 7, and 9 that the time required for chloramine, and in some instances chlorine, to kill strains of *E. typhosa* and members of the *coli-aerogenes* group is appreciably greater at low temperatures than at room temperature. Table 9 also shows that there is a considerable variation in the resistance of freshly isolated strains of *E. typhosa* and members of the *coli-aerogenes* group when subjected to the disinfecting action of chloramine, and that there is a possibility of viable *E. typhosa* persisting in treated waters as long as, and in some instances longer than, members of the *coli-aerogenes* group.

TABLE 9.—*Variation of resistance of certain freshly isolated strains of* E. typhosa *and members of the* coli-aerogenes *group to the disinfecting action of chloramine*

Date	Initial Cl. Residual p. p. m.	*E. typhosa* no.	*Coli-aerogenes* no.	Hours required to kill 99.9% of organisms: Room temperature		Low temperature	
				E. typhosa	C-A	*E. typhosa*	C-A
October 7	0.12	3080	Coli	7.95	2.15	27.1	6.35
October 1	.12	2537	849	3.50	.884	9.98	5.23
October 15	.13	8129	48451A	6.38	3.77	9.98	0.32
September 18	.20	2537	849	1.59	.66	5.60	.08
September 30	.20	2023	855	2.11	1.11	6.76	3.20
December 18	.20	M711	48600A	2.82	4.6	------	9.98
December 17	.20	8200	49816B	3.55	2.58	9.98	6.75
October 2	.22	823	837	1.50	1.0	4.62	6.83
October 14	.23	883	48760A	2.48	1.72	3.76	16.6
October 15	.23	8129	48451A	2.78	1.19	6.28	1.70

A summary of the results of the experiments to determine the killing power of chlorine is presented in table 7. It is shown that chlorine in the low initial residual ranges exhibited a killing action very similar to chloramine, in that it required an hour or more to kill at room temperature, and at low temperatures the killing time was considerably lengthened. With greater initial residuals, 0.18 p. p. m. and over, about one-half of the waters studied also resembled chloramine in their action. For these waters the time required to kill members of the *coli-aerogenes* group was equal to, or in excess of, the time required to kill strains of *E. typhosa* in over one-half of the experiments 14 out of 21 at room temperature and 18 out of 26 at low temperature.

About one-half of the waters in the higher residual range, 0.18 p. p. m. and greater, killed all the bacteria before the first portions were removed for plating. That is, the strains of *E. typhosa* and members of the *coli-aerogenes* group were killed before our first plating was made. Also the bacteria were killed both at room temperature and at low temperature before the first test was made. These observed differences in action indicate the inconstancy of chlorine waters, and also the difficulties encountered in preparing them.

Table 10, which contains parts of table 7, shows that the disinfecting action of chlorine may vary considerably from day to day in a treated water supply system, even when all controllable factors are as nearly identical as it is experimentally possible to make them.

TABLE 10.—*Variation, from day to day, of the disinfecting power of chlorine in a treated water*

Date	Initial Cl Residual p. p. m.	E. typhosa no.	Coli-aerogenes no.	Hours required to kill 99.9 percent of organisms			
				Room temperature		Low temperature	
				E. typhosa	C-A	E. typhosa	C-A
November 6	0.10	8120	48151A	5.12	14.85	22.18	28.91
October 29	.12	8120	48151A	13.1	8.72	20.42	11.01
November 27	.12	3802	8217	6.13	11.90	8.02	16.70
November 20	.13	3802	8217	27.41	25.41	41.7	41.7
November 26	.13	M711	48609A	13.1	11.05	18.05	16.71
November 19	.13	M711	48609A	0.4	11.90	20.06	20.18
December 17	.18	8209	49816B	1.39	1.11	2.93	2.96
November 25	.20	8209	49816B	<5M	<5M	<5M	<5M
October 28	.22	883	48769A	<30M	<30M	2.06	2.78
November 7	.23	883	48769A	2.58	3.10	6.30	16.2

In these experiments the water used, originally a contaminated water, had been subjected to treatment (prechlorination, coagulation, sedimentation, filtration, and postchlorination with or without post-ammoniation) at varying periods before the organisms to be tested were added to it. It is believed, however, that this study simulates certain conditions which may be met with in a water supply system.

CONCLUSIONS

1. The disinfecting action of chlorine in treated waters is variable within limits.

2. The time required for chloramine and for chlorine in some instances to kill strains of *E. typhosa* and members of the *coli-aerogenes* group is appreciably greater at low temperatures than at room temperature.

3. There is considerable variation in the resistances of freshly isolated strains of *E. typhosa* and of members of the *coli-aerogenes* group to the disinfecting action of chlorine and chloramine.

4. Certain recently isolated strains of *E. typhosa* exhibit a greater resistance to the disinfecting action of chlorine and chloramine than do old laboratory strains which have been grown on artificial media for a number of years.

5. There is a possibility of viable *E. typhosa* persisting in waters treated with chlorine or chloramine as long as, and in some instances longer than, members of the *coli-aerogenes* group.

6. These results indicate the desirability of reconsidering the significance of the *coli-aerogenes* group as a bacteriological index of the safety of chlorinated water.

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TABLE 1.—*Results of the preliminary experiments to determine the killing power of chloramine for E. typhosa and the coli-aerogenes group*

[Minus sign (–) means "No test"]

Date	Temperature °C.	Organism	Initial number of bacteria per cc	Initial cl residual p. p. m.	Number of bacteria per cc remaining after –							Later cl. residual, p. p. m.	
					5 min.	15 min	30 min	1 hr	1½ hr.	2 hr.	18 hr.	2 hr	18 hr.
1935 July 20	(–)	Ty 1679	115	0.48	47	0	0	0	(–)	(–)	(–)	0.3	(–)
				.2 .25	83	66	65	4	(–)	(–)	(–)	.08	(–)
				.05 .10	91	71	91	95	(–)	(–)	(–)	.02	(–)
Aug. 22	26 27	Ty 1679	625	.39	323	132	2	0	0	(–)	(–)	.38	(–)
				.21	378	280	120	2	0	0	(–)	.18	0
				.16	363	265	210	40	2	0	(–)	.13	0
July 31	(–)	Ty 1727	180	.4	99	2	0	0	(–)	(–)	(–)	.32	(–)
				.25	130	72	15	0	(–)	0	(–)	.16	(–)
				.10	180	150	122	48	(–)	6	(–)	.03	(–)
Sept. 4	22 23	Ty 1727	333	.38	234	151	6	0	0	(–)	(–)	.31	(–)
				.23	206	175	78	0	0	0	0	.20	0
				.12	277	234	220	118	92	41	0	.12	0
Aug. 20	25-27	Ty 1560	820	.38	144	81	6	0	0	(–)	(–)	.35	(–)
				.27	170	90	61	3	0	0	0	.18	0
				.12	190	190	145	82	64	16	0	.10	0
Sept. 3	22 23	Ty 1560	265	.38	222	101	0	0	0	(–)	(–)	.37	(–)
				.25	229	160	108	0	0	0	0	.25	.17
				.15	285	255	203	127	42	5	0	.13	.03
Aug. 14	20 31	Ty Rawlings	220	.4	30	0	0	0	0	0	(–)	.35	(–)
				.22	115	4	0	0	0	0	0	.17	0
				.12	182	83	7	1	0	0	0	.05	0
Aug. 19	25 27	Ty Rawlings	80	.35	10	2	0	0	0	0	(–)	.3	(–)
				.18	31	8	3	0	0	0	0	.12	0
				.09	30	25	7	2	0	0	0	.01	0
Aug. 13	28-29	C-A 1835	370	.4	221	4	0	0	0	0	(–)	.33	(–)
				.2	370	75	10	0	0	0	0	.18	.02
				.12	370	271	88	2	0	0	0	.05	.01
Aug. 21	25.5 27.5	C-A 1835	850	.38	318	13	0	0	0	(–)	(–)	.33	(–)
				.22	216	43	2	0	0	0	0	.20	.03
				.10	835	310	160	10	0	0	0	.01	0
Aug. 6	27 28	C-A 47004A	350	.35	183	2	1	0	0	0	(–)	.30	(–)
				.22	205	73	2	0	0	0	(–)	.17	(–)
				.14	280	165	20	1	0	0	(–)	.10	(–)

TABLE 2.—*Results of experiments to determine the killing power of chloramine for E. typhosa and the coli aerogenes group*

[Minus sign (–) means "no test"]

Date	Temperature °C.	Organism	Initial number of bacteria per cc	Initial chloramine residual p. p. m.	Number of bacteria per cc remaining after 30 min	1 hr	1½ hr	2 hr.	2½ hr	3 hr	Chloramine residual p. p. m. 2½ hr.	18 hr.
1935 Oct. 9	20-25	Ty S 129	210	0.13	192	103	37	5	[1] 2	0	0.13	0.015
				.23	31	0	0	0	0	0	.20	.055
		C-A 48151A	150	.13	82	55	25	10	7	0	.10	.05
				.23	5	0	0	0	0	0	.20	.05
	1-8	Ty S 129	210	.13	(–)	(–)	(–)	(–)	(–)	(–)	.12	.05
				.23	(–)	(–)	(–)	(–)	(–)	(–)	.18	.16
		C-A 48151A	150	.13	68	41	35	21	17	0	.10	.03
				.23	35	22	2	[1] 1	0	0	.18	.15
15	19-21	Ty S 129	225	.13	228	165	191	23	15	0	.08	.03
				.23	98	7	0	0	0	0	.23	.10
		C-A 48151A	162	.13	67	25	5	1	0	0	.08	.03
				.23	10	0	0	0	0	0	.20	.07
	2-9	Ty S 129	215	.13	[illegible]	162	161	173	80	0	.09	.08
				.23	130	81	62	25	[1] 1	0	.23	.18
		C-A 48151A	122	.13	18	12	25	13	12	0	.08	.05
				.23	17	2	0	0	0	0	.20	.20
10	19-23	Ty S 83	403	.18	168	30	0	0	0	0	.18	.03
				.18	135	0	0	0	0	0	.18	.05
		C-A 48769A	591	.18	163	7	[1] 3	0	0	0	.17	.01
				.18	125	3	0	0	0	0	.17	.03
	3-5	Ty S 83	403	.18	180	150	131	112	91	0	.17	.12
				.18	181	90	125	86	13	0	.18	.10
		C-A 48769A	591	.18	110	398	340	300	147	0	.18	.12
				.18	328	350	210	168	65	0	.18	.10
14	20-25	Ty S 83	321	.09	185	113	111	53	16	0	.08	.03
				.23	101	16	[1] 1	0	0	0	.23	.08
		C-A 48769A	454	.09	325	131	101	13	17	0	.08	.03
				.23	116	11	7	0	0	0	.22	.03
	3.5-4	Ty S 83	213	.08	86	40	38	30	30	0	.07	.05
				.23	37	17	0	5	[1] 1	0	.20	.18
		C-A 48769A	310	.08	300	278	215	212	195	0	.06	.05
				.23	(–)	210	190	113	98	0	.18	.17
Sept. 18	24-28	Ty 2537	612	.09	367	215	71	21	[1] 6	0	.08	.01
				.20	7	0	0	0	0	0	.18	.03
		C-A S 49	775	.09	161	10	11	2	[1] 1	0	.03	.03
				.20	1	0	0	0	0	0	.17	.05
	5-10	Ty 2537	612	.09	68	50	28	20	10	0	.08	.05
				.20	26	12	2	0	0	0	.17	.15
		C-A S 49	775	.09	20	16	3	2	2	0	.05	.05
				.20	4	0	0	0	0	0	.17	.15
Oct. 1	22-24.5	Ty 2537	701	.12	165	102	27	[1] 1	0	0	.10	.05
				.20	127	5	0	0	0	0	.18	.05
		C-A S 49	1,335	.12	137	7	[1] 2	0	0	0	.10	.01
				.20	13	0	0	0	0	0	.18	.05
	2-6	Ty 2537	701	.12	311	209	156	152	137	0	.09	.08
				.20	185	141	116	77	31	0	.16	.15
		C-A S 49	1,335	.12	115	450	388	358	231	0	.08	.07
				.20	381	397	193	126	51	0	.18	.15
Sept. 25	23.5-27	Ty S 23	456	.08	365	216	118	102	39	[1] 3	.02	.03
				.15	110	2	0	0	0	0	.07	.01
		C-A S 37	309	.06	214	35	6	5	0	0	.01	.01
				.15	1	0	0	0	0	0	.06	.01
	7-9	Ty S 23	456	.06	259	312	200	280	219	0	.03	.01
				.15	336	160	77	29	[1] 2	0	.10	.01
		C-A S 37	309	.06	237	212	196	171	111	0	.03	.03
				.15	196	40	0	0	0	0	.10	.01
Oct. 2	22-25	Ty S 23	226	.15	82	12	[1] 2	0	0	0	.12	.03
				.22	39	0	0	0	0	0	.17	.01
		C-A S 37	205	.15	15	0	0	0	0	0	.10	.03
				.22	4	0	0	0	0	0	.15	.01
	3-7	Ty S 23	226	.15	62	60	41	22	10	0	.13	.07
				.22	80	51	24	11	[1] 3	0	.18	.13
		C-A S 37	205	.15	176	(–)	70	30	9	0	.13	.09
				.22	157	75	15	4	[1] 1	0	.17	.13
Sept. 30	23-24	Ty 2623	537	.1	315	213	150	101	61	0	.05	.03
				.2	97	0	0	0	0	0	.15	.03
		C-A S 55	514	.1	207	75	17	6	0	0	.06	.03
				.2	5	0	0	0	0	0	.15	.03
		Ty 2623	537	.1	441	352	305	252	227	0	.06	(–)
				.2	278	216	142	71	51	0	.20	(–)
	4-9	C-A S 55	514	.1	378	312	218	182	175	0	.05	.03
				.2	204	58	4	[1] 1	0	0	.15	.15

[1] Colony identified by specific agglutination and biochemical reactions.

TABLE 2.—*Results of experiments to determine the killing power of chloramine for E. typhosa and the coli-aerogenes group*—Continued

[Minus sign (—) means "no test"]

Date	Temperature ° C.	Organism	Initial number of bacteria per cc	Initial cl. residual p. p. m.	Number of bacteria per cc remaining after— 30 min.	1 hr.	1½ hr.	2 hr.	2½ hr.	18 hr.	Later cl. residual p. p. m. 2½ hr.	18 hr.
1935 Oct. 7	22-26	Ty 3080	329	0.12	267	165	133	64	13	0	0.08	0.05
				.23	132	0	0	0	0	0	.23	.10
		C-A lab. str.	414	.12	90	1	[1] 1	[1] 1	[1] 1	0	.08	.03
				.23	[1] 1	0	0	0	0	0	.18	.08
	2-8	Ty 3080	320	.12	281	180	160	190	167	0	.07	.08
				.23	215	127	98	54	12	0	.17	.20
		C-A lab. str.	414	.12	192	121	85	60	32	0	.07	.07
				.23	95	15	4	0	0	0	.17	.20
16	22.5-24	Ty 3080	208	.13	137	97	40	26	6	0	.10	.01
				.23	58	16	0	0	0	0	.20	.09
		C-A lab. str.	280	.13	125	10	1	0	0	0	.08	.01
				.23	12	1	0	0	0	0	.20	.09
	2.5-3	Ty 3080	201	.13	107	89	70	63	52	0	10	(—)
				.23	65	41	25	17	6	0	.18	.20
		C-A lab. str.	217	.13	160	170	180	129	101	0	.10	.09
				.23	143	126	90	51	17	0	.18	.20
8	19-24	Ty T 5	283	.13	176	13	0	0	0	0	.10	04
				.23	3	0	0	0	0	0	.23	.10
		C-A 2839	377	.13	244	27	0	0	0	0	.08	.03
				.23	4	0	0	0	0	0	.18	.07
	2-7	Ty T 5	283	.13	116	66	48	82	8	0	.08	.08
				.23	61	13	0	0	0	0	.18	.18
		C-A 2839	377	.13	295	230	205	168	104	0	.08	.08
				.23	220	90	10	[1] 1	0	0	.15	.18
17	17-24.5	Ty T 5	224	.10	124	61	12	[1] 1	0	0	.07	.03
				.23	30	0	0	0	0	0	.23	.05
		C-A 2839	374	.10	205	87	26	7	2	0	.07	.03
				.23	48	0	0	0	0	0	.20	.05
	2.5-6	Ty T 5	112	.10	73	50	42	35	17	0	.07	.04
				.23	40	12	[1] 1	0	0	0	.23	.20
		C-A 2839	187	.10	135	130	126	103	98	0	.07	.03
				.23	108	87	58	25	9	0	.23	.17
23	2.5-6	Ty S 129	253	.30	84	5	3	[1] 1	0	0	.30	.20
		C-A 48451A	128	.30	40	19	15	10	0	0	.30	.20
		Ty S 83	247	.30	48	36	25	12	3	0	.30	.20
		C-A 48769A	270	.30	156	107	63	40	9	0	.30	.20
24	2-6	Ty 3080	275	.30	60	46	20	7	[1] 2	0	.30	.20
		C-A lab. str.	377	.30	186	103	44	4	1	0	.30	-----
		T 5	168	.30	63	20	8	0	0	0	.30	.20
		C-A 2839	468	.30	245	178	122	51	23	0	.30	.20

[1] Colony identified by specific agglutination and biochemical reactions.

TABLE 3.—*Results of experiments to determine the killing power of chlorine for E. typhosa and the coli-aerogenes group*

[Minus sign (—) means "no test"]

Date	Temperature ° C.	Organism	Initial number of bacteria per cc	Initial cl. residual p. p. m.	Number of bacteria per cc remaining after— 5 min.	10 min.	20 min.	½ hr.	1 hr.	1½ hr.	2 hr.	2½ hr.	18 hr.	Later cl. residual, p. p. m. 1 hr.	2½ hr.	18 hr.
1935 Nov. 19	22-22.5	Ty M 711	176	0.13	(—)	(—)	(—)	101	99	88	84	26	0	(—)	0.07	0
				.15	114	60	6	3	0	(—)	(—)	(—)	(—)	0.13	----	----
		C-A 48600A	186	.13	(—)	(—)	(—)	146	103	23	3	1	0	----	.07	0
				.15	142	98	24	5	0	(—)	(—)	(—)	(—)	.13	----	----
		Ty M 711	176	.13	(—)	(—)	(—)	130	100	93	95	84	0	----	.09	.05
				.15	89	71	32	23	[1] 4	(—)	(—)	(—)	(—)	.13	----	----
	5-1.5	C-A 48600A	186	.13	(—)	(—)	(—)	148	104	100	79	51	0	----	.09	.05
				.15	160	108	47	5	0	(—)	(—)	(—)	(—)	.13	----	----

TABLE 3.—*Results of experiments to determine the killing power of chlorine for E. typhosa and the coli-aerogenes group*—Continued

Date	Temperature ° C.	Organism	[illegible]	[illegible]	Number of bacteria per cc remaining after [illegible]									Later cl. residual, p.p.m.		
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18 hr.
1935 Nov. 26	22-23	Ty M 711	109	0.13	( )	( )	( )	[illegible]	[illegible]	[illegible]	18	[illegible]	0	.10	.09	0
				.30	[illegible]	[illegible]	[illegible]	0	( )	( )	( )	( )	( )	.30		
		C-A 48609A	119	.13	( )	( )	( )	90	60	48	20	[illegible]	0		.05	0
				.30	[illegible]	18	2	0	0	( )	( )	( )	( )	.30		
		Ty M 711	109	.13	( )	( )	( )	92	[illegible]	[illegible]	0	45	0	.13	.12	.06
				.30	40	1	[illegible]	[illegible]	( )	( )	( )	( )	( )	.30		
	4-1	C-A 48609A	119	.12	( )	( )	( )	97	[illegible]	[illegible]	57	19	0		.12	.06
				.30	80	51	71	[illegible]	[illegible]	( )	( )	( )	( )	.30		
20	22-5	Ty 3802	240	.13	( )	( )	( )	251	[illegible]	180	171	140	0	[illegible]	.00	---
				.22	133	[illegible]	[illegible]	17	( )	( )	( )	( )	( )	.20		---
		C-A S 217	300	.13	( )	( )	( )	230	218	208	185	113	0		.05	0
				.22	241	[illegible]	[illegible]	[illegible]	( )	( )	( )	( )	( )	.18		
	3.5-1.5	Ty 3802	280	.13	( )	( )	( )	[illegible]	210	[illegible]	211	[illegible]	5	.08	.08	.04
				.22	268	230	270	218	[illegible]	( )	( )	( )	( )	.18		
		C-A S 217	300	.13	( )	( )	( )	[illegible]	[illegible]	228	224	201	64		.07	.04
				.22	280	92	211	201	[illegible]	( )	( )	( )	( )	[illegible]		
27	22	Ty 3802	156	.12	( )	( )	( )	107	53	20	20	11	0	.08	.06	0
				.20	123	86	59	8	0	( )	( )	( )	( )	.18		
		C-A S 217	120	.12	( )	( )	( )	100	68	[illegible]	21	13	0		.06	0
				.20	93	80	18	2	0	( )	( )	( )	( )	.18		
		Ty 3802	156	.12	( )	( )	( )	110	130	110	103	85	0	.09	.08	.05
				.20	132	121	80	41	6	( )	( )	( )	( )	.18		
	4-2	C-A S 217	120	.12	( )	( )	( )	107	56	73	71	75	0		.08	.05
				.20	107	80	87	87	54	( )	( )	( )	( )	.18		
Oct. 28	22-21	Ty S 83	400	.11	( )	( )	( )	264	79	17	4	0	0		.09	0
				.22	( )	( )	( )	0	0	0	0	0	0		.18	.03
		C-A 48769A	418	.14	( )	( )	(-)	231	225	160	38	1	0		.09	.01
				.22	( )	( )	( )	0	0	0	0	0	0		.18	.05
		Ty S 83	400	.11	(-)	(-)	( )	278	128	72	57	28	0		.11	.12
				.22	( )	( )	( )	76	11	11	11	0	0		.22	.15
	8-2	C-A 48769A	418	.11	( )	( )	(-)	366	320	205	210	175	0		.11	.13
				.22	( )	( )	( )	220	71	3	12	11	0		.20	.18
Nov. 7	22-23	Ty S 83	261	.10	( )	( )	( )	150	127	70	51	22	0	.06	.05	0
				.23	216	185	127	78	11	( )	( )	( )	( )		.17	--
		C-A 48769A	211	.10	( )	( )	( )	177	112	68	27	18	0	.06	.01	0
				.23	168	113	101	31	3	( )	( )	( )	( )		.18	
	4-1.5	Ty S 83	261	.10	( )	( )	( )	212	198	117	130	138	0	.09	.08	.01
				.23	230	192	178	110	100	( )	( )	( )	( )		.20	
		C-A 48769A	211	.10	( )	( )	( )	160	139	118	121	119	0	.08	.08	.03
				.23	165	112	127	94	56	( )	( )	( )	( )		.20	
Oct. 20	23-21	Ty S 129	380	.12	( )	( )	( )	316	296	171	119	95	0		.06	.03
				.20	( )	( )	( )	0	0	0	0	0	0		.13	.04
		C-A 48151A	155	.12	( )	( )	( )	95	73	40	32	15	0		.06	.02
				.20	( )	( )	( )	0	0	0	0	0	0		.13	.03
	2-3	Ty S 129	380	.12	( )	( )	( )	350	323	275	230	150	0	-	.10	.06
				.20	( )	( )	( )	0	0	0	0	0	0		.18	.12
		C-A 48151A	155	.12	(-)	( )	(-)	96	73	75	54	11	0		.09	.06
				.20	( )	( )	( )	0	0	0	0	0	0		.16	.09
Nov. 6	23-22	Ty S 129	261	.1	( )	( )	( )	222	108	40	16	6	0	.07	.05	0
				.2	0	0	0	0	0	( )	( )	( )	( )	.15	( )	(-)
		C-A 48151A	171	.1	(-)	(-)	(-)	129	117	81	82	50	0	.07	.05	0
				.2	0	0	0	0	0	( )	( )	( )	( )	.10	( )	(-)
	4.5-2	Ty S 129	281	.1	(-)	(-)	(-)	282	223	178	155	138	0	.10	.08	.05
				.2	0	0	0	0	0	( )	( )	( )	( )	.15	( )	(-)
		C-A 48151A	174	.1	(-)	(-)	(-)	121	131	100	90	93	0	.10	.08	.05
				.3	99	80	14	5	0	( )	(-)	( )	( )	.15	(-)	(-)
21	22	Ty 3530	230	.1	(-)	(-)	(-)	184	157	119	110	74	0	.07	.06	0
				.2	0	0	0	0	0	(-)	(-)	(-)	(-)	.13		--
		C-A 49565C	256	.1	(-)	(-)	(-)	136	47	16	4	4	0	.07	.05	0
				.2	11	0	0	0	0	(-)	(-)	(-)	(-)	.13		
	2-4	Ty 3539	230	.1	(-)	(-)	(-)	200	180	166	163	134	0	.09	.08	.05
				.2	0	0	0	0	0	(-)	(-)	(-)	(-)	.18	----	----
		C-A 49565C	250	.1	(-)	(-)	(-)	161	148	139	102	97	0	.09	.08	(-)
				.2	0	0	0	0	0	(-)	(-)	(-)	(-)	.18	----	----

[1] Colony identified by specific agglutination and biochemical reactions.

TABLE 3.—*Results of experiments to determine the killing power of chlorine for E. typhosa and the coli-aerogenes group*—Continued

[Minus sign (—) means "no test"]

Date	Temperature °C.	Organism	Initial number of bacteria per cc	Initial Cl residual, p. p. m.	Number of bacteria per cc remaining after									Later Cl residual, p. p. m.		
					5 min.	10 min.	20 min.	½ hr.	1 hr.	1½ hr.	2 hr.	2½ hr.	18 hr.	1 hr.	2½ hr.	18 hr.
1935 Oct. 30	23-24	Ty 3080	355	0.12	(—)	(—)	(—)	221	109	162	111	61	0	0.12	0.07	0.03
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.18	.12	.05
		C-A lab. str.	306	.12	(—)	(—)	(—)	304	260	245	204	174	2	.12	.07	.03
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.18	.10	.03
	4.5-2.5	Ty 3080	355	.12	(—)	(—)	(—)	279	210	201	163	161	0	.10	.10	.06
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.17	.18	.10
		C-A lab. str.	306	.12	(—)	(—)	(—)	331	320	305	286	245	0	.10	.10	.07
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.17	.17	.10
Nov. 5	22-21	Ty 3080	188	.13	(—)	(—)	(—)	58	7	0	0	0	0	.11	.12	.06
				.28	(—)	20	7	0	0	(—)	(—)	(—)	(—)	.28	--	--
		C-A lab. str.	234	.13	(—)	(—)	(—)	96	5	0	0	0	0		.12	.06
				.28	115	58	1	0	0	(—)	(—)	(—)	(—)	.28	--	--
	6-2	Ty 3080	188	.13	(—)	(—)	(—)	113	78	53	26	24	0	.13	.13	.09
				.28	118	67	38	25	9	(—)	(—)	(—)	(—)	.25	-	-
Oct. 31	23	C-A lab. str.	234	.13	(—)	(—)	(—)	184	135	123	117	95	0	-	.13	.10
				.28	158	131	137	88	7	(—)	(—)	(—)	(—)	.28	-	-
		Ty T5	206	.10	(—)	(—)	(—)	220	218	190	147	98	0	.08	.06	0
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.18	.13	.03
		C-A 2830	145	.10	(—)	(—)	(—)	125	107	98	82	79	0	.08	.05	0
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.18	.09	.03
	3	Ty 5	206	.10	(—)	(—)	(—)	328	233	200	185	159	[1] 1	.08	.07	.05
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.18	.16	.08
		C-A 2830	145	.10	(—)	(—)	(—)	144	114	104	103	97	5	.08	.07	.04
				.20	(—)	(—)	(—)	0	0	0	0	0	0	.16	.15	.09
Nov. 4	22	Ty 5	218	.15	(—)	(—)	(—)	75	20	0	0	0	0	.15	.15	.05
				.18	(—)	0	0	0	0	0	0	0	0	.17	.17	.05
		C-A 2830	283	.15	(—)	(—)	(—)	105	46	11	[1] 2	0	0	---	.15	.05
				.18	(—)	0	0	0	0	0	0	0	0	---	.15	.04
	2.5-4.5	Ty 5	218	.15	(—)	(—)	(—)	132	117	92	81	69	0	.15	.15	.13
				.18	(—)	0	0	0	0	0	0	0	0	.18	.15	.11
		C-A 2830	283	.15	(—)	(—)	(—)	188	168	145	124	124	0	---	.15	.12
				.18	(—)	0	0	0	0	0	0	0	0	---	.17	.10
25	24-25	Ty S 200	138	.13	(—)	(—)	(—)	77	50	14	[1] 1	0	0	.09	.08	0
				.20	0	0	0	0	0	(—)	(—)	(—)	(—)	.13	---	---
		C-A 40816B	114	.13	(—)	(—)	[illegible]	91	6	[illegible]	2	[illegible]	0	--	.07	0
				.20	0	0	0	0	0	(—)	(—)	(—)	(—)	.13	---	---
	5-2	Ty S 200	138	.13	(—)	(—)	(—)	88	60	79	71	70	0	.13	.12	.03
				.20	0	0	0	0	0	(—)	(—)	(—)	(—)	.17	---	---
		C-A 40816B	114	.13	(—)	(—)	(—)	95	97	96	75	60	0	---	.19	.04
				.20	0	0	0	0	0	(—)	(—)	(—)	(—)	.17		---

[1] Colony identified by specific agglutination and biochemical reactions.

TABLE 4.—*Results of simultaneous [illegible] to determine the killing power [illegible] chlorine and chloramine for [illegible] and the coli-aerogenes group*

[Milli [illegible]]

Date	Temperature °C.	Organism	[illegible]	[illegible]	Number of [illegible] after [illegible]									Total residual, p.p.m.		
					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15 hr.
1935 Dec. 11	22	Ty S 209	[illegible]	0.30 A	[illegible]	2[illegible]	1[illegible]	1,0[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.[illegible]		---
				.15 C	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	15		---
		C A 19816B	250	.30 A	( )	13	2	0	0	[illegible]	[illegible]	[illegible]	[illegible]	20		---
				.15 C	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	17		---
	5 2.5	Ty S 209	200	.30 A	( )	[illegible]	[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.20	0.15
				.15 C	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	20	08
		C A 19816B	250	.30 A	( )		[illegible]	16	1[illegible]	[illegible]	0	0	0		20	
				.15 C	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]		20	
17	21 21.5	Ty S 209	233	.20 A	( )	( )	1[illegible]	1[illegible]	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		20	.09
				.15 C	116	79	[illegible]	1[illegible]	11	[illegible]	[illegible]	[illegible]	[illegible]	15		---
		C A 19816B	251	.20 A	( )	( )	1[illegible]	( )	1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10		---
				.15 C	172	1[illegible]	2[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15		---
	3	Ty S 209	233	.20 A	( )	( )	1	1[illegible]8	[illegible]	9[illegible]	[illegible]	[illegible]8	0	10		---
				.15 C	126	11[illegible]	90	18	22[illegible]	10	[illegible]	[illegible]	[illegible]	17	1[illegible]	13
		C A 19816B	251	.20 A	( )	( )	[illegible]	1[illegible]	5[illegible]	12	[illegible]	11	0	14	13	08
				.15 C	181	17[illegible]	11[illegible]	10[illegible]	22[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		15	13
12	21 22	Ty 3539	190	.25 A	( )	16[illegible]	11	[illegible]3	0	[illegible]	[illegible]	[illegible]	[illegible]		12	08
				.30 C	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	25		--
		C A 19565C	285	.25 A	( )	37	[illegible]	2	0	[illegible]	[illegible]	[illegible]	[illegible]	15		---
				.30 C	0	0	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	22		--
	2	Ty 3539	196	.2[illegible] A	( )	( )	( )	18[illegible]	[illegible]	3[illegible]	[illegible]	[illegible]	0	11		
				.30 C	0	0	0	0	0	0	[illegible]	[illegible]	[illegible]	0	20	20
		C A 19565C	265	.2[illegible] A	( )	( )	( )	130	10	12	[illegible]	0	0	.20	.30	12
				.20 C	0	0	0	0	0	0	( )	( )	( )		20	20
16	20–21.5	Ty 3539	200	.20 A	( )	( )	109	13	[4]2	( )	( )	( )	( )		20	10
				.20 C	0	0	0	0	0	( )	( )	( )	( )	18		--
		C A 49565C	252	.20 A	( )	(--)	10	9	0	( )	( )	( )	( )	17		- -
				.20 C	0	0	0	0	0	(-)	( )	( )	( )	18		---
	3–4	Ty 3539	200	.20 A	(-)	(--)	(-)	116	95	30	21	8	0	[3]18	15	.15
				.20 C	0	0	0	0	0	0	0	(-)	( )	[3]17	11	.12
		C-A 49565C	252	.20 A	( )	(--)	(-)	130	39	25	7	[4]1	0		18	15
				.20 C	0	0	0	0	0	0	0	( )	( )		13	.12
9	23	Ty 3802	100	.30 A	(-)	(-)	(-)	[4]2	0	0	( )	( )	( )	28	-	---
				.30 C	126	102	42	15	0	0	( )	( )	( )	25		-
		C-A 8217	240	.30 A	( )	( )	(-)	1	0	0	( )	( )	( )	28		--
				.30 C	153	35	2	3	0	0	( )	( )	( )	26		
	5–1.5	Ty 3802	190	.30 A	( )	(-)	(-)	110	51	3[illegible]	21	7	0	[3]25	28	.20
				.30 C	161	112	105	103	79	55	17	(-)	( )	25	28	18
		C A 8217	246	.30 A	( )	(-)	(-)	221	123	81	29	6	0		28	.20
				.30 C	210	216	190	151	144	93	40	( )	( )		.28	.20
19	20 21	Ty 3802	161	.18 A	( )	( )	101	86	50	( )	( )	( )	( )	16		--
				.15 C	150	110	133	121	111	( )	( )	( )	( )	06		--
		C A 8217	313	.18 A	( )	( )	221	198	35	( )	( )	( )	( )	11		--
				.15 C	281	236	226	220	200	( )	( )	( )	( )	0[illegible]		--
	3 0.5	Ty 3802	161	.18 A	( )	( )	( )	117	100	65	60	64	0	[3]17	13	.08
				.15 C	200	183	151	118	141	108	92	( )	( )		12	03
		C-A 8217	313	.18 A	( )	( )	( )	287	255	216	233	226	0		.06	07
				.15 C	281	276	255	202	210	223	219	( )	( )		.06	.01
10	21–23	Ty M 711	111	.32 A	( )	62	37	15	0	( )	( )	( )	( )	26		-
				.30 C	(-)	81	45	35	[4]1	( )	( )	( )	( )	25		-
		C-A 48609A	158	.32 A	(-)	90	10	0	0	( )	( )	( )	( )	25		-
				.30 C	(--)	95	41	16	[4]1	( )	( )	( )	( )	.25		
	2–2.5	Ty M 711	111	.32 A	(--)	(-)	(—)	7	0	0	0	0	0	[3].28	.25	.20
				.30 C	(—)	60	21	17	[4]1	5	0	[4]5	0	[3].26	.25	.18
		C-A 48609A	158	.32 A	(—)	(—)	(—)	27	4	0	0	0	0		.25	.20
				.30 C	(—)	101	72	51	22	13	5	0	0		.25	.18
18	22	Ty M 711	204	.20 A	(—)	(—)	126	75	31	(—)	(—)	(-)	(—)	.15	-	---
				.25 C	0	0	0	0	0	(—)	(—)	(—)	(-)	.13	-	---
		C-A 48609A	245	.20 A	(—)	(—)	175	118	8	(—)	(—)	(—)	(-)	.15	- -	----
				.25 C	0	0	0	0	0	(—)	(—)	(—)	(—)	.13	-	----
	3–4	Ty M 711	204	.20 A	(—)	(—)	(—)	[5]	[5]	[5]	[5]	[5]	[5]	[5]	[3].15	---
				.25 C	0	0	0	0	0	0	0	(—)	(--)	[3].20	.15	.13
		C-A 48609A	245	.20 A	(—)	(—)	(—)	185	130	92	62	20	0		.18	.10
				.25 C	0	0	0	0	0	0	0	(—)	(—)	----	.17	.12

[1] Denotes chloramine.
[2] Denotes chlorine.
[3] Residual of control sample in order not to disturb test sample.
[4] Colony identified by specific agglutination and biochemical reactions.
[5] Flask containing sample broke

Table 5.—*Summary of the preliminary experiments to determine the killing power of chloramine for E. typhosa and the coli-aerogenes group*

[Minus sign (–) means "no test"]

Date	Organism				Initial Cl residual, p. p. m.	pH	Temperature °C.	Cl residual after 2 hr., p. p. m.	Hours required to kill 99.9 percent of organisms	
	E. typhosa		C-A group							
	Identification no.	Age in days	Identification no.	Age in days					E. typhosa	C-A group
1935										
Aug. 19	Rawlings	(1)	(–)	(–)	0.09	7.1	30.5	0.04	1.76	(–)
July 29	1679	4	(–)	(–)	.05–.10	(–)	(–)	.02	4.75	(–)
31	1727	5	(–)	(–)	.10	(–)	(–)	.06	6.05	(–)
Aug. 21			1835	26	.10	6.8	26.5	.06		6.75
14	Rawlings	(1)	(–)	(–)	.12	7.1	30	.08	3.10	(–)
13			1835	18	.12	(–)	28.5	.08		4.18
20	1560	21	(–)	(–)	.12	(–)	26	.10	3.88	(–)
Sept. 4	1727	40	(–)	(–)	.12	6.7	22.5	.12	8.48	(–)
Aug. 6			47094A	30	.14	(–)	27.5	.10		2.28
Sept. 3	1560	35	(–)	(–)	.15	6.7	22.5	.13	5.88	(–)
Aug. 22	1679	28	(–)	(–)	.16	6.7	26.4	.13	2.45	(–)
19	Rawlings	(1)	(–)	(–)	.18	7.1	26	.12	1.50	(–)
13			1835	18	.20	(–)	28.5	.18		1.0
22	1679	28	(–)	(–)	.21	6.9	26.4	.18	1.46	(–)
14	Rawlings	(1)	(–)	(–)	.22	7.1	30	.17	.54	(–)
6			47094A	30	.22	(–)	27.5	.17		1.11
21			1835	26	.22	6.7	26.5	.20		.50
Sept. 4	1727	40	(–)	(–)	.23	6.7	25.5	.20	2.32	(–)
July 29	1679	4	(–)	(–)	.2–.25	(–)	(–)	.08	2.82	(–)
31	1727	5	(–)	(–)	.25	(–)	(–)	.16	2.0	(–)
Sept. 3	1560	35	(–)	(–)	.25	6.7	22.5	.25	4.43	(–)
Aug. 20	1560	21	(–)	(–)	.27	(–)	26	.18	1.35	(–)
19	Rawlings	(1)	(–)	(–)	.35	7.1	30.5	.30	.47	(–)
6			47094A	30	.35	(–)	27.5	.30		.63
21			1835	26	.38	7.1	2[illegible].5	.33		.83
20	1560	21	(–)	(–)	.38	(–)	26	.35	.81	(–)
Sept. 3	1560	35	(–)	(–)	.38	6.7	22.5	.37	1.76	(–)
4	1727	40	(–)	(–)	.38	6.7	2[illegible].5	.34	1.83	(–)
Aug. 22	1679	28	(–)	(–)	.39	6.7	26.4	.38	1.72	(–)
July 31	1727	5	(–)	(–)	.40	(–)	(–)	.32	1.0	(–)
Aug. 14	Rawlings	(1)	(–)	(–)	.40	6.9	30	.35	.37	(–)
13			1835	18	.40	(–)	28.5	.33		1.25
July 20	1679	4	(–)	(–)	.48	(–)	(–)	.30	.6	(–)

[1] Several years.

TABLE 6.—*Summary of the experiments to determine the killing power of chloramine for E. typhosa and the coli-aerogenes group*

[illegible]

Date	Organism: E. typhosa: Identification no.	E. typhosa: Age (days)	C-A group: Identification no.	C-A group: Age (days)	Room temperature: [illegible]	pH	[illegible]	Cl [illegible]	Hours required to kill [illegible]: [illegible]	[illegible]	Low temperature: [illegible]	Cl [illegible]	Hours required to kill 99.9 percent of organisms: E. typhosa	C-A group
1935														
Sept. 25	823	16	837	15	0.08	6.7	25	0.02	10.28	18.15	8	0.03	8.7	20.01
18	2537	12	849	5	.09	6.7	26	.06	4.85	2.60	7.0	.06	1.30	2.55
Oct. 11	883	25	48769A	65	.09	7.0	22.5	.06	8.91	5.47	4.5	.07	8.05	30.0
Sept. 30	2623	20	855	17	.10	6.7	23.5	.05	8.88	2.03	6.0	.06	5.7	30.7
Oct. 17	T5	[1] 25	2839	24	.10	7.0	21	.06	5.28	5.21	1	.07	12.31	22.8
7	3080	2	Coli	(2)	.12	6.7	24	.08	7.05	2.15	5	.08	27.1	6.35
1	2537	25	849	18	.12	6.7	23.5	.10	3.30	.841	1	.09	9.98	5.23
16	3080	11	Coli	(2)	.13	7.1	23.5	.10	6.22	2.12	3	.10		20.5
9	8129	7	48151A	72	.13	6.9	22.5	.10	6.33	6.81	1.5	.12		6.35
15	8129	13	48151A	78	.13	7.1	21.5	.08	6.38	3.77	0.5	.09	9.98	6.32
8	T5	[1] 25	2839	15	.13	6.7	21.5	.11	5.0	4.01	1.0	.13	6.58	15.50
Sept. 25	823	16	837	15	.15	6.4	25	.07	2.10	.812	8	.10	1.48	3.88
Oct. 2	823	23	837	22	.15	6.7	23.5	.12	2.70	1.55	5	.13	5.35	6.18
10	883	21	48769A	61	.18	6.7	21	.18	3.23	1.01	1	.18	10.55	9.00
10	883	21	49769A	61	.18	6.7	21	.18	2.04	1.01	1	.18	7.75	19.9
Dec. 19	3802	37	8217	41	.18	7.0	20.5	[3] .15	6.58	7.23	2	.13	11.01	53.5
Sept. 18	2537	12	849	5	.20	6.7	26	.17	1.59	.09	7.5	.17	5.60	68
Oct. 1	2537	25	849	18	.20	6.7	23.5	.18	0.813	0.813	1	.18	2.85	1.50
Sept. 30	2623	20	855	17	.20	6.7	23.5	.15	2.11	1.11	0.5	.20	6.76	3.20
Dec. 18	M711	30	48009A	135	.20	7.2	22	[3] .15	2.82	1.6	3.5	.15		9.98
17	8209	39	49816B	112	.20	7.2	21.5	[3] .15	3.85	2.58	3	.15	9.98	6.75
16	3539	51	49565C	116	.20	7.2	21	[3] .18	2.60	1.00	3.5	.15	4.62	7.48
Oct. 2	823	23	837	22	.22	6.6	23.5	.17	1.80	1.00	5	.18	1.62	6.83
7	3080	2	Coli	(2)	.23	6.7	24	.18	3.73	.08	5	.17	7.20	2.21
16	3080	11	Coli	(2)	.23	6.9	23.5	.17	2.18	1.11	3	.18	5.28	10.22
9	8129	7	48151A	72	.23	6.7	22.5	.20	1.87	1.11	1.5	.18		2.75
14	883	25	48769A	65	.23	6.7	22.5	.22	2.48	1.72	4	.20	3.76	18.6
8	T5	[1] 25	2839	15	.23	6.7	21.5	.18	0.813	1.11	1.5	.18	2.21	1.96
15	8129	13	48151A	78	.23	6.9	21.5	.23	2.78	1.19	5.5	.23	6.28	1.70
17	T5	[1] 25	2839	24	.23	6.9	21	.23	1.74	1.67	4	.23	1.18	6.98
Dec. 12	3539	47	49565C	112	.25	7.2	21.5	[3] .25	2.05	.934	2	.20	7.92	3.55
9	3802	27	8217	31	.30	7.4	23	[3] .28	1.695	1.11	3	.28	3.88	2.18
11	8209	33	49816A	108	.30	7.2	22	[3] .20	6.8	2.18	4	.20	12.80	2.68
Oct. 23	8129	21	48151A	86	.30	7.2		.30			4	.30	3.25	3.92
23	883	34	48769A	74	.30	7.2		.30			4	.30	1.13	6.92
24	3080	19	Coli	(2)	.30			.30			1	.30	1.05	4.85
24	T5	[1] 25	2839	31	.30			.30			1	.30	3.38	6.40
Dec. 10	M711	22	48009A	127	.32	7.2	22	[3] .25	2.82	1.63	2.5	.25	1.26	1.91

[1] Plus years.
[2] Several years.
[3] Cl residual after 1 hour.

TABLE 7.—*Summary of the experiments to determine the killing power of chlorine for E. typhosa and the coli-aerogenes group*

Date	Organism: E. typhosa: Identification no.	Organism: E. typhosa: Age in days	Organism: C-A group: Identification no.	Organism: C-A group: Age in days	Room temperature: Initial Cl res. p. p. m.	Room temperature: pH	Room temperature: Temperature °C.	Room temperature: Cl residual after 2½ hr., p. p. m.	Room temperature: Hours required to kill 99.9 percent of organisms: E. typhosa	Room temperature: Hours required to kill 99.9 percent of organisms: C-A group	Low temperature: Temperature °C.	Low temperature: Cl residual after 2½ hr., p. p. m.	Low temperature: Hours required to kill 99.9 percent of organisms: E. typhosa	Low temperature: Hours required to kill 99.9 percent of organisms: C-A group
1935														
Oct. 31	T5	[1] 25	2839	38	0.10		23	0.06	17.65	26.2	3	0.07	27.5	31.4
Nov. 7	883	49	48769A	80	.10	7.5	22.5	.05	8.17	8.17	3	.08	17.05	16.2
6	S129	35	48451A	100	.10	7.5	22.5	.05	5.12	11.85	3	.08	22.18	28.01
21	3539	26	49565C	91	.10		22	.05	19.40	3.80	3	.08	30.98	17.1
Oct. 30	3080	25	Coli	([2])	.12		23.5	.07	10.87	20.38	3.5	.10	21.1	34.82
29	8129	27	48151A	92	.12		23.5	.09	13.1	8.72	2.5	.10	20.42	11.01
Nov. 27	3802	15	8217	19	.12		22	.06	6.13	11.90	3	.08	8.02	16.70
25	8209	17	49816B	90	.13	7.9	24.5	.08	4.29	2.39	3.5	.12	22.92	29.6
26	M711	10	48609A	115	.13		22.5	.09	13.1	11.05	2.5	.12	18.05	16.71
20	3802	8	8217	12	.13	7.8	22.5	.06	27.8	25.41	2.5	.08	41.7	41.7
19	M711	1	48609A	100	.13	7.6	22.5	.07	9.4	11.90	3	.09	20.06	20.18
5	3080	31	Coli	([2])	.13	7.5	21.5	.12	1.76	3.22	4	.13	8.73	7.84
Oct. 28	883	40	48769A	80	.14	7.3	23	.09	3.0	0.98	5	.11	6.55	22.57
Nov. 19	M711	1	48609A	100	.15	7.0	22.5	[3] .13	.98	1.11	3	[3] .13	1.7	1.62
4	T5	[1] 25	2839	42	.15	7.3	22	.15	2.62	3.75	3.5	.15	12.38	17.10
Dec. 10	3802	37	8217	41	.15		20.5	[3] .06	6.86	14.05	2	.12	14.01	22.4
Nov. 4	T5	[1] 25	2839	42	.18	7.3	22	.17	<10.M	<10.M	3.5	.15	<10.M	<10.M
Dec. 17	8209	39	49816B	112	.18	7.0	21.5	[3] .10	1.39	1.11	3	.13	2.93	2.96
Nov. 25	8209	17	49816B	90	.20	7.9	21.5	[3] .13	<5.M	<5.M	3.5	[3] .17	<5.M	<5.M
Oct. 29	8129	27	48151A	92	.20		23.5	.13	<30.M	<30.M	2.5	.18	<30.M	<30.M
30	3080	25	Coli	([2])	.20		23.5	.12	<30.M	<30.M	3.5	.18	<30.M	<30.M
31	T5	[1] 25	2839	38	.20		23	.13	<5.M	<5.M	3	.16	<5.M	<5.M
Nov. 6	S129	35	48451A	100	.20	7.5	22.5	[3] .15	<5.M	<5.M	3	[3] .15	<5.M	1.35
21	3539	26	49565	91	.20		22	[3] .13	<5.M	<5.M	3	[3] .18	<5.M	<5.M
27	3802	15	8217	19	.20		22	[3] .18	2.14	3.78	3	[3] .18	4.51	10.12
Dec. 16	3539	51	49565C	116	.20	7.2	21	[3] .17	<5.M	<5.M	3.5	.13	<5.M	<5 M
Nov. 20	3802	8	8217	12	.22	7.9	22.5	.20	6.7	5.06	2.5	[3] .18	17.05	10.42
Oct. 28	883	40	48769A	80	.22	7.3	23	.18	<30.M	<30.M	5	.22	2.06	2.78
Nov. 7	883	19	48769A	80	.23	7.5	22.5	[3] .17	2.58	3.10	3	.20	6.30	16.2
Dec. 18	M711	30	48609A	135	.25	7.0	22	[3] .13	<5.M	<5.M	3.5	.15	<5.M	<5.M
Nov. 5	3080	31	Coli	([2])	.28	7.5	21.5	[3] .28	.71	.795	4	[3] .28	1.74	2.32
Dec. 9	3802	27	8217	31	.30	7.2	23	[3] .25	1.095	1.67	3	.28	6.77	10.86
Nov. 26	M711	10	48609A	115	.30		22.5	[3] .30	1.31	1.30	2.5	[3] .30	3.55	3.63
Dec. 10	M711	22	48609A	127	.30	7.2	22	[3] .25	2.97	1.72	2.5	.25	5.14	3.23
12	3539	47	49565C	112	.30	7.1	21.5	[3] .15	<5.M	<5.M	2	.20	<5.M	<5.M
11	8209	33	49816B	106	.45	7.4	22	[3] .15	<5.M	<5.M	4	.20	<5.M	<5.M

[1] Years, plus.
[2] Several years.
[3] Cl residual after 1 hour.

DEATHS DURING WEEK ENDED SEPT. 12, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 12, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	6,976	6,928
Deaths per 1,000 population, annual basis	9.7	9.7
Deaths under 1 year of age	501	459
Deaths under 1 year of age per 1,000 estimated live births	45	42
Deaths per 1,000 population, annual basis, first 37 weeks of year	12.3	11.5
Data from industrial insurance companies:		
Policies in force	68,415,419	67,573,738
Number of death claims	8,880	10,767
Death claims per 1,000 policies in force, annual rate	6.8	8.3
Death claims per 1,000 policies, first 37 weeks of year, annual rate	10.1	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officer

Reports for Weeks Ended Sept. 19, 1936, and Sept. 21, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 19, 1936, and Sept. 21, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935
New England States:								
Maine	1	2	---	1	8	10	3	0
New Hampshire	1	---			1		0	0
Vermont	---				3	9	0	0
Massachusetts	7	4			17	6	1	8
Rhode Island	---	---				7	0	0
Connecticut	---	2	2		3	9	0	0
Middle Atlantic States:								
New York [4]	18	20	[1] 2	[1] 8	80	72	4	17
New Jersey	10	10	8	2	14	19	1	8
Pennsylvania	14	25	---		10	30	2	8
East North Central States:								
Ohio	14	32	8	5	12	7	1	8
Indiana	15	53	7	14	2	12	1	2
Illinois	28	50	4	7	10	21	8	2
Michigan	13	0	---	1	14	23	1	1
Wisconsin	4	5	6	30	17	41	0	1
West North Central States:								
Minnesota	5	6	---	3	6	11	0	1
Iowa	2	18	---	---	3	1	0	0
Missouri	6	52	18	63	---	9	0	0
North Dakota	---	7	4	1	---	2	0	0
South Dakota	---	1	---	---	2	---	0	0
Nebraska	3	8	---	---	1	2	0	1
Kansas	9	5	---	1	1	2	0	0
South Atlantic States:								
Delaware	---	2	---	5	2	9	0	0
Maryland [3, 4]	3	8	2	8	7	5	8	8
District of Columbia	5	10	---	---	---	---	0	2
Virginia	23	35	---	---	4	8	2	2
West Virginia	5	43	2	32	2	5	4	1
North Carolina [2]	53	67	---	5	6	15	2	0
South Carolina [2]	27	17	94	161	---	2	0	0
Georgia [2]	27	84	---	0	---	0	1	0
Florida [2]	5	15	3	1	---	5	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 19, 1936, and Sept. 21, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935
East South Central States:								
Kentucky	11	[illegible]		2	13	12	3	1
Tennessee[4]	13	[illegible]	[illegible]	23	1		6	7
Alabama[4]	[illegible]	[illegible]	11	13		3	2	2
Mississippi[3]	19	[illegible]					0	0
West South Central States:								
Arkansas	7	11		10		2	0	0
Louisiana	11	3	[illegible]	8		[illegible]	1	1
Oklahoma[5]	10	[illegible]	16	13	1		1	0
Texas[4]	33	74	[illegible]	27	10	7	3	0
Mountain States:								
Montana			[illegible]	1	1	3	0	0
Idaho		[illegible]	1	1			0	0
Wyoming					1	11	0	0
Colorado	3	[illegible]			3	1	0	0
New Mexico	1	8		[illegible]	10		0	0
Arizona	[illegible]		[illegible]	3	1		0	0
Utah	1				1	[illegible]	0	0
Pacific States:								
Washington			1		11	[illegible]	0	2
Oregon	1		4	11	2	[illegible]	0	0
California[4]	30	31	[illegible]	10	10	77	1	1
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]
First 38 weeks of year	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935
New England States:								
Maine	1	18	[illegible]	3	0	0	1	1
New Hampshire	0	[illegible]	3	1	0	0	0	0
Vermont	0		[illegible]	5	0	0	0	0
Massachusetts	1	13	13	[illegible]	0	0	4	1
Rhode Island	0	37	12	12	0	0	1	1
Connecticut	0	32	9	37	0	0	4	0
Middle Atlantic States:								
New York[4]	12	198	88	120	0	0	20	39
New Jersey	1	52	13	21	0	0	19	5
Pennsylvania	8	12	105	97	0	0	22	43
East North Central States:								
Ohio	17	3	111	122	0	0	39	35
Indiana	3	3	30	73	0	1	17	16
Illinois	48	12	98	230	4	1	28	40
Michigan	11	15	70	74	4	0	7	22
Wisconsin	4	3	18	95	1	2	4	3
West North Central States:								
Minnesota	3	6	27	61	4	1	2	13
Iowa	4	3	18	61	2	2	4	7
Missouri	4	1	2	49	0	0	23	21
North Dakota	2	4	3	18	14	1	1	6
South Dakota	0	0	9	4	0	1	0	3
Nebraska	0	1	5	13	0	0	1	2
Kansas	3	2	18	48	0	14	7	12
South Atlantic States:								
Delaware	0	0	1	2	0	0	1	1
Maryland[3 4]	7	5	17	23	0	0	5	22
District of Columbia	0	7	8	12	0	0	0	1
Virginia	5	8	12	19	0	0	24	28
West Virginia	7	2	20	61	0	0	28	20
North Carolina[3]	1	8	18	53	0	0	28	30
South Carolina[3]	0	0	6	8	0	0	13	18
Georgia[3]	9	1	22	[illegible]	0	0	32	28
Florida[3]	1	0	4	7	0	0	0	8

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 19, 1936, and Sept. 21, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935	Week ended Sept. 19, 1936	Week ended Sept. 21, 1935
East South Central States.								
Kentucky	1	18	31	63	5	0	50	21
Tennessee [2]	17	4	36	48	0	0	31	38
Alabama [2]	13	0	14	18	0	0	13	28
Mississippi [3]	6	1	58	15	0	0	19	4
West South Central States.								
Arkansas	1	3	5	5	0	0	7	6
Louisiana	2	2	7	16	0	0	11	30
Oklahoma [5]	1	0	2	8	0	0	24	26
Texas [2]	5	1	27	20	0	0	28	48
Mountain States.								
Montana	0	0	11	36	5	0	16	2
Idaho	1	0	4	17	0	0	1	4
Wyoming	2	1	0		0	0	1	0
Colorado	8	0	12	31	3	0	2	2
New Mexico	4	1	2	2	0	0	20	18
Arizona	2	2	0	5	0	0	3	8
Utah [3]	0	0	3	21	0	0	0	1
Pacific States:								
Washington	10	0	13	23	2	4	5	8
Oregon	2	0	10	20	0	0	7	4
California [3]	15	27	88	115	0	1	20	18
Total	212	665	1,211	1,811	41	28	600	697
First 38 weeks of year	2,282	7,938	188,692	180,824	6,244	5,451	9,868	12,801

[1] New York City only.
[2] Typhus fever, week ended Sept. 19, 1936, 55 cases, as follows: New York, 1; North Carolina, 1; South Carolina, 1; Georgia, 32; Florida, 2; Tennessee, 1; Alabama, 9; Texas, 7; California, 1.
[3] Week ended earlier than Saturday.
[4] Rocky Mountain spotted fever, week ended Sept. 19, 1936, Maryland, 1 case.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August 1936										
Alabama	3	67	22	1,259	10	22	111	45	1	136
California	9	98	45	17	252	7	43	282	3	71
Colorado	8	11			16		10	54	2	10
Illinois	11	87	16	24	36		60	347	7	89
Maryland	10	21	4	4	74		1	46	0	36
Michigan	8	19	1	8	50		15	272	2	30
Minnesota	2	19	5		14		8	85	12	14
Mississippi	3	74	410	9,184	120	357	45	23	0	84
Nevada	1		3				0	12	0	2
New Jersey	8	22	31	5	157		2	74	0	44
New York	32	57		12	523		39	393	0	87
Ohio	13	50	31	11	71		39	279	5	75
Oklahoma [1]	1	43	34	249	25	20	1	33	0	142
South Carolina	2	159	205	1,276	24	94	3	3	0	99
Tennessee	9	71	41	322	20	26	114	50	0	212
Texas	4	121	126	4,264	107	53	4	81	2	245
West Virginia	3	41	16		43		8	58	0	58

[1] Exclusive of Oklahoma City and Tulsa.

Summary of Monthly Reports from States—Continued

August 1936	Cases
Actinomycosis:	
California	2
Illinois	1
Chicken pox:	
Alabama	7
California	103
Colorado	25
Illinois	123
Maryland	9
Michigan	167
Minnesota	26
Mississippi	158
Nevada	3
New Jersey	66
New York	318
Ohio	133
Oklahoma [1]	3
South Carolina	9
Tennessee	4
Texas	11
West Virginia	4
Dengue:	
Alabama	2
Mississippi	7
Texas	3
Diarrhea:	
Maryland	55
Ohio (under 2 years, enteritis included)	33
South Carolina	678
Dysentery:	
Alabama (amoebic)	1
California (amoebic)	15
California (bacillary)	13
Illinois (amoebic)	9
Illinois (bacillary)	13
Illinois (amoebic carriers)	37
Maryland	33
Michigan (bacillary)	5
Minnesota (amoebic)	2
Minnesota (bacillary)	5
Mississippi (amoebic)	111
Mississippi (bacillary)	791
New Jersey (amoebic)	3
New Jersey bacillary)	5
New Jersey (unspecified)	1
New York (amoebic)	5
New York (bacillary)	20
Ohio (bacillary)	5
Oklahoma [1]	56
Tennessee (amoebic)	5
Tennessee (other forms)	123
Texas (bacillary)	28
Epidemic encephalitis:	
Alabama	1
California	10
Colorado	13
Illinois	2
Maryland	2
Michigan	5
Minnesota	1
New York	15
Ohio	2
Tennessee	3
Food poisoning:	
California	10
German measles:	
California	52
Illinois	12
Maryland	9
Michigan	58
New Jersey	29
New York	60
Ohio	17
Tennessee	1
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
Mississippi	430
South Carolina	106
Tennessee	1

August 1936—Continued	Cases
Impetigo contagiosa:	
Maryland	5
Oklahoma [1]	3
Tennessee	7
Lead poisoning:	
Illinois	3
Michigan	1
New Jersey	1
Ohio	6
Leprosy:	
California	1
Mumps:	
Alabama	54
California	567
Colorado	22
Illinois	75
Maryland	103
Michigan	121
Mississippi	255
New Jersey	209
Ohio	58
Oklahoma [1]	3
South Carolina	21
Tennessee	13
Texas	237
West Virginia	19
Ophthalmia neonatorum:	
Alabama	2
California	1
Illinois	7
Maryland	2
Mississippi	12
New Jersey	10
New York	12
Ohio	81
Oklahoma [1]	1
South Carolina	8
Tennessee	6
Paratyphoid fever:	
California	8
Colorado	1
Illinois	5
Michigan	4
Minnesota	1
New Jersey	1
New York	15
Ohio	1
South Carolina	6
Tennessee	6
Texas	15
West Virginia	1
Puerperal septicemia:	
Mississippi	27
Ohio	3
Tennessee	1
Rabies in animals:	
Alabama	82
California	65
Illinois	26
Michigan	7
Mississippi	12
New Jersey	6
New York [2]	6
South Carolina	21
Texas	8
Rabies in man:	
Illinois	3
Relapsing fever:	
California	2
Rocky Mountain spotted fever:	
Illinois	1
Maryland	4
New York	1
Septic sore throat:	
California	7
Illinois	3
Maryland	5
Michigan	18
Minnesota	1
New York	19
Ohio	70

August 1936—Continued	Cases
Septic sore throat—Con.	
Oklahoma [1]	12
Tennessee	2
Tetanus:	
Alabama	12
California	5
Illinois	8
Maryland	3
Michigan	1
New Jersey	2
New York	10
Oklahoma [1]	1
South Carolina	2
Tennessee	1
Trachoma:	
California	13
Illinois	316
Maryland	3
Mississippi	11
Ohio	3
Oklahoma [1]	2
Tennessee	107
Trichinosis:	
California	1
Illinois	1
Michigan	1
New York	5
Tularaemia:	
California	2
Illinois	1
Maryland	1
Minnesota	1
Nevada	7
Ohio	3
Texas	4
Typhus fever:	
Alabama	70
Maryland	2
New York	4
Oklahoma [1]	1
South Carolina	1
Tennessee	1
Texas	40
Undulant fever:	
Alabama	5
California	13
Illinois	4
Maryland	7
Michigan	5
Minnesota	6
Mississippi	1
New Jersey	3
New York	17
Ohio	9
Oklahoma [1]	20
Tennessee	1
Texas	2
Vincent's infection:	
Illinois	19
Maryland	11
Michigan	18
New York [2]	61
Oklahoma [1]	1
Tennessee	12
Whooping cough:	
Alabama	24
California	739
Colorado	171
Illinois	622
Maryland	471
Michigan	927
Minnesota	125
Mississippi	146
Nevada	11
New Jersey	440
New York	988
Ohio	885
Oklahoma [1]	2
South Carolina	57
Tennessee	66
Texas	122
West Virginia	50

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

PLAGUE IN PLACER COUNTY, CALIFORNIA

Under date of September 15, 1936, Surgeon C. R. Eskey reports a human case of plague in a female patient residing at Lake Tahoe, Placer County, Calif., with onset on July 23. Positive findings for plague by culture and animal inoculation were reported by Dr. K. F. Meyer, of the Hooper Foundation for Medical Research, University of California.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 12, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	----	0	0	0	0	0	0	0	2	20
New Hampshire:											
Concord	0	--	0	0	1	3	0	0	0	0	10
Nashua	0	--	--	0	-	0	0		0	0	------
Vermont:											
Barre	0	----	0	0	0	0	0	0	0	0	3
Burlington	0	----	0	0	0	0	0	0	0	0	5
Rutland	0	----	0	0	1	0	0	0	0	0	8
Massachusetts:											
Boston	1	----	1	5	9	13	0	8	0	63	165
Fall River	0	----	0	0	0	0	0	1	0	0	17
Springfield	0	----	0	1	0	1	0	1	0	2	30
Worcester	1	----	0	1	5	3	0	2	0	16	47
Rhode Island:											
Pawtucket	0	----	0	0	0	0	0	0	0	0	10
Providence	0	----	0	0	0	4	0	2	0	11	67
Connecticut:											
Bridgeport	0	----	0	2	1	1	0	0	1	0	43
Hartford	0	----	0	1	1	3	0	1	0	8	40
New Haven	0	----	0	0	0	1	0	1	1	0	43
New York:											
Buffalo	0	----	1	2	5	4	0	4	8	1	125
New York	8	7	1	22	44	20	0	76	14	98	1,153
Rochester	0	----	0	0	1	0	0	2	1	2	50
Syracuse	0	----	0	1	1	1	0	1	0	28	36
New Jersey:											
Camden	1	----	1	1	2	0	0	0	1	0	20
Newark	0	----	0	0	2	3	0	11	2	17	105
Trenton	0	----	0	0	3	0	0	0	0	5	23
Pennsylvania:											
Philadelphia	2	----	5	0	13	15	0	22	0	76	356
Pittsburgh	3	2	2	1	14	10	0	4	1	25	112
Reading	0	----	0	1	0	1	0	1	0	17	31
Scranton	1	----	----	0	--	0	0	.	1	1	------
Ohio:											
Cincinnati	1	----	1	2	5	1	0	7	0	1	125
Cleveland	0	8	0	0	7	15	0	7	2	40	149
Columbus	1	----	0	0	1	4	0	3	4	6	64
Toledo	0	----	0	2	8	11	0	2	1	17	50
Indiana:											
Anderson	0	----	0	0	2	1	0	1	1	2	9
Fort Wayne	----	----	----	----	----	----	----	----	----	----	----
Indianapolis	1	----	0	0	3	3	0	3	0	3	72
Muncie	0	----	0	0	0	0	0	0	0	0	10
South Bend	0	----	0	2	0	0	0	1	0	2	18
Terre Haute	0	----	0	0	0	3	0	0	0	0	16
Illinois:											
Alton	0	----	0	0	0	0	0	0	0	0	6
Chicago	8	1	0	0	25	34	0	28	7	73	603
Elgin	0	----	0	0	1	0	0	0	0	1	6
Moline	0	----	0	0	0	0	0	1	0	0	10
Springfield	0	----	0	0	0	0	0	1	0	0	18

City reports for week ended Sept. 12, 1936—Continued

State and city	Diphtheria cases	Influenza: Cases	Influenza: Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Michigan:											
Detroit	5	-	0	3	14	19	0	12	1	88	213
Flint	-	-	-	-	-	-	-	-	-	-	-
Grand Rapids	0	-	0	0	0	5	0	0	0	5	23
Wisconsin:											
Kenosha	0	-	0	0	0	4	0	1	0	1	4
Madison	0	-	0	0	1	0	0	0	0	12	11
Milwaukee	0	2	2	2	1	11	0	3	0	41	93
Racine	0	-	0	0	0	3	0	0	0	0	14
Superior	0	-	0	0	0	1	0	0	0	0	4
Minnesota:											
Duluth	0	-	0	0	2	5	0	0	0	14	20
Minneapolis	0	-	0	3	5	2	0	0	0	11	50
St. Paul	0	-	0	2	5	4	0	1	0	11	48
Iowa:											
Cedar Rapids	0	-	-	0	-	0	0	-	0	0	-
Davenport	0	-	-	0	-	0	0	-	0	0	-
Des Moines	1	-	-	0	-	0	0	-	0	0	31
Sioux City	0	-	-	0	-	4	1	-	0	0	-
Waterloo	1	-	-	0	-	1	0	-	0	0	-
Missouri:											
Kansas City	1	-	0	1	3	2	0	3	0	4	94
St. Joseph	1	-	0	0	0	1	0	1	0	2	13
St. Louis	1	-	0	0	1	4	0	8	7	22	179
North Dakota:											
Fargo	0	-	0	0	0	1	0	0	0	0	6
Grand Forks	0	-	-	0	-	0	0	-	0	0	-
Minot	0	-	0	0	0	1	0	0	0	0	6
South Dakota:											
Aberdeen	0	-	-	0	-	0	0	-	0	0	-
Sioux Falls	0	-	0	0	0	0	0	0	0	0	10
Nebraska:											
Omaha	2	-	0	0	0	0	0	1	1	0	31
Kansas:											
Lawrence	0	-	0	0	0	0	0	0	0	0	-
Topeka	0	-	0	0	1	0	0	1	0	0	18
Wichita	1	-	0	1	1	1	0	0	0	0	21
Delaware:											
Wilmington	0	-	0	0	0	0	0	0	0	3	21
Maryland:											
Baltimore	1	-	0	9	8	6	0	8	1	95	170
Cumberland	0	2	0	0	0	1	0	0	0	0	14
Frederick	0	-	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	9	-	0	0	5	10	0	10	1	34	153
Virginia:											
Lynchburg	3	-	0	0	0	0	0	0	3	3	13
Norfolk	0	-	0	0	1	0	0	0	0	1	30
Richmond	0	-	0	0	3	0	0	1	1	0	49
Roanoke	4	-	0	0	0	0	0	0	0	0	19
West Virginia:											
Charleston	-	-	-	-	-	-	-	-	-	-	-
Huntington	0	-	0	0	0	4	0	0	0	0	-
Wheeling	0	-	0	0	2	1	0	0	1	0	18
North Carolina:											
Gastonia	1	-	0	0	0	1	0	0	0	0	-
Raleigh	0	-	0	0	1	0	0	3	1	0	19
Wilmington	0	-	0	0	0	0	0	0	0	0	10
Winston-Salem	0	-	0	0	0	0	0	1	1	0	12
South Carolina:											
Charleston	0	2	0	0	1	0	0	0	1	0	17
Columbia	-	-	-	-	-	-	-	-	-	-	-
Florence	0	-	0	0	1	0	0	0	0	0	18
Greenville	0	-	0	0	0	0	0	0	0	0	10
Georgia:											
Atlanta	2	1	0	0	8	4	0	0	2	0	77
Brunswick	0	-	0	0	0	0	0	0	0	0	3
Savannah	0	-	0	0	3	0	0	0	2	0	25
Florida:											
Miami	0	-	0	0	1	0	0	3	0	2	29
Tampa	1	-	0	3	0	1	0	2	0	0	36
Kentucky:											
Ashland	1	-	-	0	-	0	0	1	1	0	6
Covington	0	-	0	0	0	2	0	0	0	0	14
Lexington	0	-	0	0	0	0	0	0	0	0	25
Louisville	1	-	0	0	0	2	0	2	5	12	57

City reports for week ended Sept. 12, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Tennessee:											
Knoxville	1		0	0	0	1	0	2	1	1	17
Memphis	0		0	0	0	1	0	6	1	0	66
Nashville	0		0	0	2	2	0	1	3	0	40
Alabama:											
Birmingham	2		0	0	[illegible]	0	0	2	5	0	40
Mobile	1		0	0	0	1	0	0	0	0	22
Montgomery	1			0		0	0		0	0	-------
Arkansas:											
Fort Smith	--									—	-------
Little Rock	0		0	0	4	1	0	1	0	0	6
Louisiana:											
Lake Charles	0		1	0	0	0	0	0	0	0	6
New Orleans	2	1	1	0	5	8	0	10	2	0	128
Shreveport	0		0	0	6	0	0	2	0	0	45
Oklahoma:											
Tulsa	0	-		0		1	0		1	0	-------
Texas:											
Dallas	2		0	1	0	2	0	0	1	1	62
Fort Worth	1		0	3	1	2	0	2	0	0	25
Galveston	0		0	0	1	1	0	0	0	0	15
Houston	0		1	0	6	2	0	9	2	0	76
San Antonio	2	--	0	0	5	0	0	5	0	0	58
Montana:											
Billings	1	----	0	0	0	1	0	0	0	0	4
Great Falls	0		0	0	1	1	0	0	0	2	7
Helena	0		0	0	0	1	0	0	0	0	5
Missoula	0		0	0	1	0	0	0	0	0	5
Idaho:											
Boise	0	---	0	0	1	0	0	1	0	0	10
Colorado:											
Colorado Springs	0	----	0	0	0	0	0	1	0	0	18
Denver	0	----	1	2	6	3	0	2	2	31	98
Pueblo	0	------	0	0	1	1	0	0	0	0	10
New Mexico:											
Albuquerque	0	----	0	0	0	1	0	4	3	0	12
Utah:											
Salt Lake City	0	-----	0	0	0	4	0	1	0	6	28
Nevada:											
Reno	-------	------	--------	---	-	--	-		-	---	-------
Washington:											
Seattle	0	------	0	3	2	0	0	2	1	4	81
Spokane	0	-----	0	3	2	2	0	0	0	0	22
Tacoma	0	-----	0	0	0	1	0	1	0	0	23
Oregon:											
Portland	0	------	0	0	5	1	0	2	4	3	83
Salem	0	-	-----	0		0	0		0	1	-------
California:											
Los Angeles	11	9	0	6	12	12	0	17	1	34	299
Sacramento	1	-	0	0	1	11	0	0	0	22	24
San Francisco	1		0	2	7	10	0	3	0	8	169

City reports for week ended Sept. 12, 1936—Continued

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases	State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Maine:				North Dakota:			
Portland	0	0	1	Fargo	0	0	1
Massachusetts:				Nebraska:			
Boston	1	0	2	Omaha	0	0	2
New York:				Maryland:			
Buffalo	1	0	0	Baltimore	2	0	0
New York	8	2	5	District of Columbia:			
Rochester	1	0	0	Washington	1	1	0
New Jersey:				Virginia:			
Newark	0	0	1	Richmond	1	1	0
Pennsylvania:				West Virginia:			
Philadelphia	0	0	1	Huntington	0	1	0
Pittsburgh	0	0	1	Kentucky:			
Ohio:				Louisville	0	1	0
Columbus	1	1	0	Tennessee:			
Toledo	0	0	2	Memphis	1	1	3
Indiana:				Knoxville	0	0	2
Indianapolis	0	0	1	Alabama:			
Illinois:				Birmingham	0	0	3
Chicago	0	2	20	Louisiana:			
Springfield	1	0	0	New Orleans	1	0	0
Michigan:				Colorado:			
Detroit	0	0	1	Denver	0	0	2
Wisconsin:				Utah:			
Milwaukee	0	0	1	Salt Lake City	0	0	1
Iowa:				Oregon:			
Davenport	0	0	1	Portland	1	0	2
Des Moines	0	0	2	California:			
Missouri:				Los Angeles	0	0	6
St. Louis	1	0	2				

Dengue.—Cases: Atlanta, 1.
Epidemic encephalitis.—Cases: Philadelphia, 1; Cumberland, 1; Denver, 2; San Francisco, 1.
Pellagra.—Cases: Philadelphia, 1; Columbus, 1; Winston-Salem, 1; Atlanta, 1; Savannah, 3; Birmingham, 1; Dallas, 1; Denver, 1; Sacramento, 1; San Francisco, 1.
Rabies in man.—Deaths: Chicago, 3.
Typhus fever.—Cases: Atlanta, 1; Savannah, 1; Birmingham, 1; Fort Worth, 1; Houston, 1; Los Angeles, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Two weeks ended September 5, 1936.—During the 2 weeks ended September 5, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	[illegible]					6
Chicken pox		1			[illegible]	10	[illegible]	9	16	124
Diphtheria		1	1	[illegible]	[illegible]	[illegible]	5	7		78
Dysentery				1	[illegible]	1				[illegible]
Erysipelas				[illegible]	7	[illegible]	3	1	9	25
Influenza		2			13	[illegible]			3	23
Measles			1	63	66	[illegible]	82	14	76	307
Mumps					[illegible]	4	15	9	[illegible]	122
Paratyphoid fever		1			[illegible]					6
Pneumonia					4				4	8
Poliomyelitis			1	9	11	27	2	1	[illegible]	54
Scarlet fever	4		8	71	91	51	[illegible]	68	10	351
Trachoma						1	1			2
Tuberculosis		18	[illegible]	12	67	[illegible]	97	3	31	424
Typhoid fever			1	63	15	2	15	12	7	115
Undulant fever				1	3					4
Whooping cough		13		[illegible]	201	12	15	16	14	135

DENMARK

Communicable diseases—April, May, and June 1936.—During the months of April, May, and June 1936, cases of certain communicable diseases were reported in Denmark as follows:

Disease	April	May	June	Disease	April	May	June
Anthrax		1		Paratyphoid fever	6	10	3
Cerebrospinal meningitis	11	6	4	Poliomyelitis	8	8	8
Chicken pox	101	90	26	Puerperal fever	15	18	18
Diphtheria and croup	163	183	116	Scabies	716	549	550
Epidemic encephalitis	2	5		Scarlet fever	507	397	383
Erysipelas	285	223	177	Syphilis	81	56	56
German measles	871	759	330	Tetanus, neonatorum	1	3	4
Gonorrhea	799	741	828	Tetanus, traumatic	1		2
Influenza	13,543	9,782	4,672	Typhoid fever	4	1	8
Malaria	4	10	8	Undulant fever (Bact. abort. Bang)	62	58	73
Measles	325	341	298	Whooping cough	2,857	2,382	2,221
Mumps	891	629	467				
Paradysentery	19	18	188				

GERMANY

Bremen—Poliomyelitis.—During the period May 17 to August 22, 1936, 44 cases of poliomyelitis were reported in Bremen, Germany. During the week ended August 22, 1936, 11 cases of poliomyelitis were reported.

JAMAICA

Communicable diseases—4 weeks ended September 5, 1936.—During the 4 weeks ended September 5, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		2	Poliomyelitis		2
Chicken pox	1	19	Puerperal septicemia		2
Diphtheria		1	Scarlet fever	2	2
Dysentery	8	14	Tuberculosis	38	70
Erysipelas		1	Typhoid fever	21	118
Leprosy	1	1			

YUGOSLAVIA

Communicable diseases—August 1936.—During the month of August 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	111	14	Poliomyelitis	18	1
Cerebrospinal meningitis	6	3	Scarlet fever	310	3
Diphtheria and croup	752	65	Sepsis	8	5
Dysentery	681	80	Tetanus	62	32
Erysipelas	217	7	Typhoid fever	1,217	81
Measles	31	1	Typhus fever	16	2
Paratyphoid fever	151	4			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 25, 1936, pages 1348–1361. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 30, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Bombay.—During the week ended September 12, 1936, 1 suspected case of cholera was reported in Bombay, India.

Plague

Argentina—Santiago del Estero Province—Isca Yacu.—During the period September 1–15, 1936, 1 case of pneumonic plague with 1 death was reported in Isca Yacu, Santiago del Estero Province, Argentina.

Egypt—Asyut Province.—During the week ended September 12, 1936, 3 cases of plague were reported in Asyut Province, Egypt.

England—Liverpool.—On September 4, 1936, [illegible] plague-infected rats were found on the vessel *[illegible]* at Liverpool, England. The vessel came from Montevideo, Buenos Aires, Rosario, Santos, and Las Palmas.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—Ten rats found September 17, 1936, and 5 rats found September 21, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

United States—California.—A report of plague in California appears on page 1392 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Mexico.—During the month of June 1936, smallpox has been reported in Mexico as follows: Aguascalientes, Aguascalientes State, 1 case; Guadalajara, Jalisco State, 7 cases, 7 deaths; Mexico, D. F., 18 cases, 2 deaths; Mexico State, 2 cases, 2 deaths; Nayarit State, 1 death; Puebla, Puebla State, 3 cases, 2 deaths; San Luis Potosi, San Luis Potosi State, 1 case.

Typhus Fever

Mexico.—During the month of June 1936, typhus fever has been reported in Mexico as follows: Aguascalientes, Aguascalientes State, 1 case; Guadalajara, Jalisco State, 1 case; Mexico, D. F., 23 cases, 18 deaths; Mexico State, 1 death; Oaxaca State, 1 case; Puebla, Puebla State, 3 cases, 2 deaths; Queretaro State, 1 case; San Luis Potosi, San Luis Potosi State, 3 cases.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Muzo, Boyaca Department, December 28, 1935, to January 4, 1936, 2 cases; January 4, to May 15, 1936, 9 deaths; Cundinamarca Department, February 11, 1936, 1 death; July 2–26, 1936, 3 deaths; Intendencia of Meta—Acacias, January 7, 1936, 1 death; Restrepo, June 4 to July 26, 1936, 6 deaths; Villavicencio, January to July 1936, 6 deaths; Santander Department, June and July 1936, 6 deaths.

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PUBLIC HEALTH REPORTS

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INFLUENZA MORTALITY IN THE UNITED STATES, 1936[1]

By MARY GOVER, *Associate Statistician, United States Public Health Service*

One of the chief characteristics of an influenza epidemic is the suddenness of its outbreak and the rapidity with which it spreads over a large area. Any unusual increase in the number of reported cases of influenza in a locality is, therefore, usually viewed with alarm.

Six of the 17 years since the summer of 1919 have failed to show more than the seasonal expectancy of deaths from influenza and pneumonia. During the other 11 years recognizable outbreaks of influenza have occurred. Mortality in about 95 cities scattered throughout the United States shows that the 11 epidemics since the pandemic of 1918 have varied in size from a total excess mortality rate of 99.3 per 100,000 from influenza and pneumonia in 1919–20 to 5.4 per 100,000 in the winter of 1934–35.

Influenza epidemics occur most frequently in January and February. Of the 11 epidemics since the summer of 1919, 1 reached its peak of mortality in December, 3 in January, 4 in February, 2 in March, and 1 in May.

Various sections of the country are by no means equally affected during the course of an influenza epidemic. In the epidemic of 1919–20, for example, the excess mortality from influenza and pneumonia in the Mountain States was almost twice what it was in the Middle Atlantic area. In some of the smaller outbreaks large areas have entirely escaped the epidemic; thus in the winter of 1931–32 the East South Central and Mountain and Pacific areas show no increase in influenza and pneumonia mortality, the epidemic being largely confined to the East Coast. There is some evidence that isolated outbreaks of influenza occur which, because of their limited extent, do not appear in the curve of mortality for all cities.

It is characteristic of influenza epidemics that they originate in one section of the country and spread to adjacent areas. In the 11 epidemics since the summer of 1919, 2 have started on the East Coast, 2 in the East Central, 3 in the West Central, and 4 in the Pacific and Mountain areas. The direction of spread has also varied in different epidemics. The epidemic of 1925–26 started on the West Coast and

[1] From the Office of Statistical Investigations, U. S. Public Health Service. Acknowledgment is made to Dr. W. M. Gafafer for advice in the preparation of this report. Previous papers on influenza may be found in the Public Health Reports for February 21, 1930 (Reprint No. 1355) and November 29, 1935 (Reprint No. 1720).

took a southerly course from west to east, while that of the winter of 1931-32 traveled from the mountain section eastward across the northern States.

Mortality from influenza and pneumonia combined in the 95 cities in the United States for 1935-36 is shown in figure 1, the solid line representing the rates for 1935-36 and the broken line those for the corresponding weeks of 1934-35, which is a fairly representative year. The curve for the winter of 1935-36 shows two periods of relatively high mortality, from December 29 to January 18 and from February 9 to May 2. The small epidemic of the winter of 1934-35 occurred in the same weeks of the year as the first part of the epidemic of the winter of 1935-36. Since the middle of last May, mortality

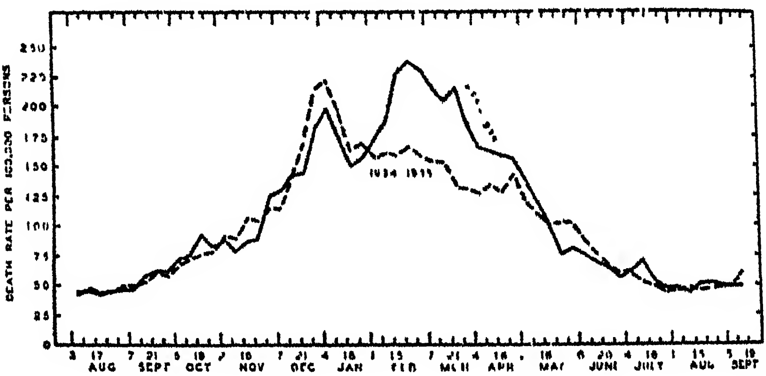

FIGURE 1.—Weekly death rates per 100,000 population (annual basis) for influenza and pneumonia in about 95 large cities in the United States, from the week ending August 10, 1935, to September 19, 1936, and for corresponding weeks of the preceding year.

from influenza and pneumonia in the 95 cities has been as low as it was in the corresponding weeks of last year.

The epidemic of the past winter started in the West South Central section of the country early in December 1935, and spread through the Southern States to the eastern coast. In both the West and East South Central areas mortality from influenza and pneumonia continued well above the normal expectancy from December 1935 until the first part of May 1936. It did not at any time during the winter, however, reach extreme proportions in any section, and the Mountain and Pacific areas showed only very slight evidences of any increase in mortality.

Mortality during the summer of 1936 for each geographic region of the United States is shown in table 1. In 7 of the 9 regions the rates for the summer of 1936 are not significantly different from those of last year, but in the East and West South Central areas, where the epidemic of last winter was the most severe, influenza and pneumonia mortality has continued somewhat above normal. In the East South

Central section, the higher mortality continued from the middle of July to the first of September. In the West South Central area the higher mortality continued only through June, but there was another slight increase during August. Although these increases in mortality during the summer months are apparent in both areas, the excesses over last year are of a minor order. There is no significant increase in the rates for the last week for which data are available, that is, the week ending September 19.

TABLE 1.—*Mortality from influenza and pneumonia in about 95 cities in different geographic sections of the United States, for the summers of 1935 and 1936*

Section and year	Average of 16 weeks, May 31–Sept. 19	Week ending															
		June				July				August					September		
		6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19
		Annual death rate per 100,000 population															
All cities:																	
1936	56	80	71	68	63	56	60	60	52	46	46	42	49	50	48	47	51
1935	57	100	[illegible]	75	65	50	59	51	47	43	44	46	43	45	46	47	58
New England:																	
1936	61	[illegible]	112	57	81	74	88	71	59	61	29	55	31	33	31	42	50
1935	58	116	95	86	48	47	52	74	48	31	28	53	18	50	47	50	57
Middle Atlantic:																	
1936	48	72	64	60	41	47	42	67	44	35	41	36	44	52	44	41	43
1935	55	112	90	72	64	55	55	48	46	35	48	40	42	43	42	43	46
East North Central:																	
1936	48	67	66	63	61	50	60	66	46	36	44	27	37	36	39	36	35
1935	52	84	77	61	64	61	52	40	36	46	35	41	40	39	40	52	66
West North Central:																	
1936	61	101	64	49	58	64	109	69	46	63	30	61	61	38	46	49	66
1935	63	135	75	73	63	52	69	81	61	49	52	20	61	40	40	43	92
South Atlantic:																	
1936	76	103	89	107	87	51	85	99	70	48	60	50	50	83	70	63	95
1935	67	117	111	105	70	66	58	43	40	60	53	76	41	58	49	51	70
East South Central:																	
1936	83	114	107	154	88	67	40	100	107	60	47	114	134	67	40	47	47
1935	53	60	87	114	87	34	74	17	53	41	20	60	20	27	61	54	13
West South Central:																	
1936	105	139	119	116	156	100	96	70	73	89	110	70	109	110	103	96	99
1935	80	80	113	99	89	158	126	99	104	56	69	76	80	66	86	60	59
Mountain:																	
1936	83	97	53	97	159	133	27	44	53	115	97	62	53	97	79	97	62
1935	80	137	103	111	111	77	60	60	85	51	86	51	34	94	85	0	120
Pacific:																	
1936	49	63	50	41	45	52	54	41	57	45	39	45	57	34	54	45	59
1935	44	49	36	50	52	31	50	45	37	30	45	54	20	53	47	48	39

Reported cases of influenza in 44 States and New York City roughly parallel the curve of mortality for 1935–36. In the 18 weeks from December 29 to May 2 there were 121,011 cases of influenza reported, an excess of 78,213 cases over the number reported in the corresponding weeks of 1934, a year of low influenza incidence. In the East and West South Central areas, cases were reported in excess of the average as late as the end of May.

Throughout the period of the epidemic of 1936, California was reporting more than the average number of cases of influenza for preceding years, but the curve of mortality for the Pacific section was only slightly higher than normal. By May 2 the number of reported cases in California had dropped to normal. However, during the 5 weeks from May 31 to July 4, California reported 2,177 cases of

influenza as against an expectancy of 124, or an excess of 2,053 cases. A summer rise, such as this, is unusual. However, there was no corresponding rise in mortality and since July 4 and through September 19, California as well as the Pacific area has been reporting only an average number of cases for that season of the year.

That an epidemic of influenza may occur this winter is possible, but mortality from influenza does not indicate that such an epidemic is in progress in any section of the country at the present time.

AUDIOMETRIC STUDIES ON SCHOOL CHILDREN [1]

I. The Consistency and Significance of Tests Made with a 4 A Audiometer

By Antonio Ciocco,[2] *Assistant Statistician, United States Public Health Service*

INTRODUCTION

This is the first of a series of papers in which will be presented the results of an investigation on the hearing of school children begun in 1931 by the Office of Child Hygiene of the United States Public Health Service. As conceived, this investigation has the following aims: First, to evaluate critically the methods employed in studies of deafness in children. Second, to determine the degree and progression of hearing impairment and the clinical and other factors associated with it. Third, to formulate a program which, it is hoped, will permit a conclusive contribution toward the solution of the problem of prevention of deafness.

The initial step in the investigation consisted of a general survey of the hearing of an unselected group of approximately 14,000 Washington, D. C., school children. These children were given, in immediate succession, two tests with a Western Electric Co. 4 A audiometer. Those individuals, approximately 700 in number, who showed a hearing loss of 9 or more S. U. (sensation units) in either ear were further tested, for air- and bone-conduction acuity, with a 2 A audiometer, and at the same time received a fairly complete otolaryngological examination. In addition, an equal number of children of the same age, sex, and school grade as the above-mentioned group of 700 children, but whose hearing loss was not greater than 6 S. U., also were tested with a 2–A audiometer and received an ear, nose, and throat examination. Two years later, during the school year 1933–34, approximately 500 children of this group of 1,400 were given a second otolaryngological examination and a second 2–A audiometer test. Future plans for the investigation include continued periodic clinical examinations of these and other school children.

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[1] From the Office of Child Hygiene Investigations.

[2] The author wishes to acknowledge the valuable work of B. L. Jarmon, M. D., who made the audiometric and clinical examinations.

The present paper contains the results of a study of the consistency and significance of tests made with a 4-A audiometer. The development of this instrument and the efforts of Fowler (8, 9, 10, 11), Fletcher (7, 8, 10), Newhart (15, 16, 17), the American Federation of Organizations for the Hard of Hearing (1), and others have emphasized to otologists and to public-health and school authorities the importance of examining the hearing of school children. The immediate and practical objectives of such studies are to detect hearing impairment in children and, on the basis of these findings, to give to the hard-of-hearing child the benefits of special medical and educational care.

There are two essential advantages derived from the use of the 4-A audiometer: (*a*) rapid group testing and (*b*) uniform scoring of results. Because of the practical utility of this instrument numerous surveys have been conducted in this country since the first was reported by Fowler and Fletcher (8) in 1926.[1] These authors stated that 14.4 percent of the New York school children whom they tested had impaired hearing. They regard the hearing impaired when the test reveals a hearing loss of 9 S. U. or more. Although in a later paper they advised that a loss of 6 S. U. should be considered significant, 9 S. U. generally is accepted as the lower limit of impairment. Fowler and Fletcher also suggested that children who showed impairment at the first test should be retested before being placed definitely in the category of those needing special attention. It has been noted that the second test usually reduces the number of children with "impaired" hearing by 50 percent or more. And even of these, a certain percentage is found to have normal hearing when further examined.

TABLE 1.—*Percentage of school children with impaired hearing as reported by several investigators*

Author	Number of children examined	Percentage of children with hearing impairment[1] as shown by—		
		First test	Second test	Third test
Fowler and Fletcher (8)	4,112	(?)	14.4	(?)
Fowler and Fletcher (10)	1,171	17.6	4.9	(?)
Rodin (21)	6,222	17.0	8.5	(?)
Rodin (22)	30,101	17.7	9.5	(?)
Laurer (14)	4,419	(?)	11.8	(?)
Burnap (3)	1,525	[2] 9.0	[2] 7.5	(?)
Freund (12)	9,741	24.4	7.7	5.2
Rossell (23)	6,781	(?)	11.6	(?)
Partridge and MacLean (18)	399	8.7	5.5	[3] 4.
Rowe and Drury (24)	2,078	[4] 28.0	[5] 13.3	(?)

[1] Hearing loss≧9 S. U., unless otherwise indicated.
[2] Hearing loss≧6 S. U.
[3] Retested in a sound-proof room.
[4] Hearing loss≧3 S. U.
[5] Retested with a 2-A audiometer.

[1] For a comprehensive review of the methods and results of hearing surveys made prior to 1926, *cf.* C. C. Bunch: Methods of testing the hearing in infants and young children. Jour. Pediat., 5: 535 (1934).

Since 1926 the examination of children at regular intervals with a 4–A audiometer has become an established practice in the schools of a number of cities and large towns. The results of a number of surveys are summarized here in table 1. This table shows clearly the reduction in the incidence of hearing impairment disclosed by a second test. When the children were examined a third time a further reduction was obtained. Also it is seen that the percentage of children with impaired hearing varies considerably from one observer to another. In fact Newhart (16), from the replies to a questionnaire sent to known users of the 4–A audiometer in 1929, stated that this percentage varies from 1.33 in Denver to 13 in Cambridge.

Besides reports on the incidence of impairment, attempts have been made to find what factors are related to various degrees of hearing acuity. Laurer (14) observed that the incidence of impairment was higher in children of the lower grades. Similar observations have been reported by Sterling and Bell (27), who examined the hearing of some 1,800 children of Hagerstown, Md., and Washington, D. C. Their results are not strictly comparable with those of the studies mentioned above, as only the hearing loss of the better ear was reported. They found that the greatest amount of hearing loss occurred in children who were poorest in their school work. They noted also that there were more children with normal hearing in the older age groups than in the younger, but that the incidence of a significant loss of hearing was higher in the older children.

The investigations of Rowe and Drury (24) on children different with respect to social and economic background showed that, conditions of the ear being equal, the acuity of hearing depends upon the nutritional state of the individual. Rowe (25) believes that "the children who pass the test have demonstrated, first, that they have average hearing capacity; second, that they have an average nutritional level; and, third, that they have an average mental acuity."

These findings suggest that the 4–A audiometer is not an instrument of precision and that the results of tests made with this instrument are influenced by factors which probably are not directly related to the function of hearing. It is pertinent, therefore, to measure the degree of variability of the hearing tests made with this instrument and to determine some of the factors which contribute to the variability. Such is the purpose of the study here reported.

MATERIAL

The data here utilized include the following:

1. Records of hearing tests made with a Western Electric Co. 4–A audiometer on approximately 14,000 children. All tests were conducted in a schoolroom, 40 children at a time. Each child was given two successive tests, occupying a different seat in the school-

room and using different earphones for the first and second tests. These records were supplemented by information regarding age, sex, school grade, and intelligence quotient.

2. Records of tests of both air- and bone-conduction acuity, measured with a Western Electric Co. 2 A audiometer, made on (*a*) about 700 children of the previous group whose 4 A test showed a hearing loss of 9 S. U. or more and (*b*) an equal number of children of the same age, sex, and school grade whose 4 A test showed a hearing loss not greater than 6 S. U.

VARIATIONS IN THE RESULTS OF REPEATED TESTS WITH A 4-A AUDIOMETER

The distributions of the best scores made by the children on the first and second tests, respectively, are presented in table 2. For the first test, a hearing loss equal to or greater than 9 S. U. is found in 6.55 ± 0.15 percent of the children; for the second test, the same loss is observed in only 5.36 ± 0.14 percent of the subjects. This improvement in the best scores of the group is statistically significant, the difference in incidence being about six times [4] its probable error. The stated percentages are somewhat lower than those found by the authors cited in table 1, yet they fall well within the range of those reported by Newhart (16).

TABLE 2.—*Distribution of ears according to hearing loss measured with a 4-A audiometer*

Hearing loss in S. U.	First test		Second test	
	Absolute number	Percentage	Absolute number	Percentage
−3	14,127	50.52	15,303	54.76
0	6,429	22.98	6,291	22.51
3	3,307	11.83	2,954	10.57
6	2,269	8.11	1,901	6.80
9	998	3.57	829	2.97
12	462	1.65	351	1.26
15	151	.54	132	.47
18	95	.34	60	.22
21	24	.09	30	.11
24	27	.10	23	.08
27	12	.04	6	.02
30	63	.23	65	.23
Total	27,964	100.00	27,945	100.00

Since the two tests were made in immediate succession, the better average score obtained in the second test cannot be attributed logically to an improvement in hearing, nor is it reasonable to assume that there was a significant change of environmental conditions

[4] This is based on the assumption that the two distributions are independent. They are not. Therefore the ratio of difference to the probable error of difference will be even larger when the proper corrections are made.

between the two tests. It is apparent, therefore, that the only acceptable conclusion is that the difference between the two average scores is to be ascribed to variations or errors due, in part, to the subjects and, in part, to the technique of measurement.

In order to measure the extent of these variations, the difference between the best score of the first test and the best score of the second test (score of second test minus score of the first test) was calculated for each ear of each child. The statistical constants for the resulting distribution [5] of these differences are given in table 3. In agreement with the findings in table 2, the sign of the arithmetic mean indicates that, on the average, the scores have improved at the second trial. The immediately pertinent fact, however, which emerges from a study of this distribution is the degree of the variability, or, inversely, the consistency of response to the two tests. As a measure of the variation, the following constants are used: Standard deviation, mean deviation, and percentage of cases showing an arithmetic difference of 3 S. U. or less. The range of variation marked out by one standard deviation above and below the mean is thus found to be almost 8 S. U. This means that a difference between two tests even of 8 S. U. cannot be regarded as exceptional. On the average, each ear shows a difference of almost 3 S. U. on successive tests, and as many as 20 percent present a difference greater than 3 S. U. An opinion as to whether the above variability is large or small cannot be given as yet because of the lack of comparative data.

TABLE 3.- *Statistical constants for the distribution of individual differences between scores of first and second tests (score of second test minus score of first test)*

Number of ears	7,921
Mean of differences	0.180 ± 0.005 S. U.
Standard deviation of differences	3.903 ± 0.001 S. U.
Mean deviation of differences	2.672 S. U.
β_1	0.011
β_2	5.818.
Percent of ears with difference equal to or less than 3 S. U.	80.00

Two factors which might be regarded as having contributed to the different scores obtained in the two tests are the subject's fatigue and sudden changes in environmental noise. With regard to the first, it should be noted that the symmetrical shape of the curve of differences between scores seems to contradict such a view. If the children were fatigued after the first test, the curve of differences would be

[5] The distribution curve is of the symmetrical, "cocked-hat" type, definitely leptokurtic (i. e., relatively more peaked about the mode than the normal curve) and with slight negative skewness. That it is not a "normal" curve is evident, since β_2 is significantly greater than 3 and the ratio of standard deviation to the mean deviation is less than 0.8.

asymmetrical and skewed toward the positive side. Regarding the second factor, it may be argued that the differences in the two scores would be greater in the children with good hearing than in those with some impairment. Actually this is not so, as is seen in the following tabulation, which shows the hearing loss in the first test and the percent of children whose second test differed from the first by a maximum of 3 S. U. The frequency of ears for which the scores in the two tests differed at the most by 3 S. U. decreases as the hearing loss increases. Thus, children with better hearing, who are more likely to be affected by extraneous noise, show less variation than those with poorer hearing.

Hearing loss, first test, in S U.	Percentage of ears with differences equal to or less than 3 S U.
−3	91.27
0	85.61
3	60.00
6	46.05
9+	37.21

In this and many similar examinations of hearing no attempt was made to exclude the participation of one ear when testing the other. Such an omission is of little practical consequence when the two ears possess equal hearing acuity; but when they are different, no measure of the acuity of the poorer ear can be obtained except by masking the better one (2).[6] Direct comparison between the variability of the better ear and that of the poorer ear of each child is presented in table 4. The standard deviation and mean deviation of the differences between scores observed for the better ears are markedly and significantly less than they are for the poorer ears. Correspondingly, the percentage of children who showed a difference equal to or less than 3 S. U. is higher when the subjects are grouped according to the ears giving the better scores. While on the average the poorer ear improves its score on the second trial, the better one does not. In view of the fact that other conditions presumably remain equal, these results point to the conclusion that the improvement shown by the poorer ear is essentially due to the subject's ability to utilize the better ear in hearing with the poorer ear. If this is true, the difference between the observed variability of the poorer and that of the better ear represents the measure of variation in the ability to utilize the better ear. *In order to elim-*

[6] The Committee on Methods of Testing Hearing by Bone Conduction of the American Otological Society, at the meeting held in Detroit, May 28, 1936, has emphasized, in its report, that masking is necessary if clinical tests of hearing are to have any diagnostic or scientific value.

inate this additional source of variability all further analysis will be made by using the best score of the better ear only.

TABLE 4.—*Differences between scores of first and second tests (score of second test minus score of first test)*

	Mean of difference	Standard deviation of differences	Mean deviation of differences	Percent of children with differences equal to or less than 3 S.U.
Poorer ear	−1.212±0.024	4.202±0.017	3.191	73.08
Better ear	+ .507± .020	3.480± .014	2.207	84.28

SEX DIFFERENCES IN VARIABILITY

The distribution of the differences between first and second test is practically the same for boys and girls. The statistical constants are presented in table 5. The mean of the differences is slightly higher in the girls, but this divergence is only probably significant, being about two times its probable error. The remaining constants differ by insignificant amounts.

TABLE 5.—*Differences between scores of first and second tests in boys and girls (score of second test minus score of first test)*

Sex	Number of children	Mean of differences	Standard deviation of differences	Mean deviation of differences	Percent of children with differences equal to or less than 3 S.U.
Boys	7,802	0.467±0.028	3.509±0.020	2.201	84.16
Girls	6,657	.550± .029	3.450± .020	2.212	84.42

AGE, SCHOOL GRADE, INTELLIGENCE QUOTIENT, AND VARIABILITY

The findings of Laurer (14), Sterling and Bell (27), and Rowe and Drury (24), regarding the relationship of hearing loss, measured with a 4–A audiometer, to social and economic status of children, their age, school grade, and school work, raises the question of whether or not this apparent relationship may be due to the influence of these factors on the consistency of responses to the test.

In table 6 are presented the indexes of variability for the several age groups. The standard deviations and the mean deviations decrease with increase in age. For the age group 14 years and over, the standard deviation of the differences between the scores of the first and second tests is 18 percent less than that for the 7–9 year old group, and the mean deviation is 29 percent less. At the same time,

the percentage of children who showed a difference equal to or less than 3 S. U. between scores increases from 76 for the 7–9 year group to 87 for the group 14 years and over. It is worthy of note that, while this age trend is consistent, the difference between the standard deviation of the 7–9 year group and that of the 10–11 year group is only probably significant. The same is true for differences between the standard deviation of the third and that of the fourth age group, but between that of the 10–11 year group and of the 12–13 year old group the difference is definitely significant.

TABLE 6.—*Age and differences between scores of first and second tests (score of second test minus score of first test)*

Age (in years)	No. of children	Standard deviation of differences	Mean deviation of differences	Percent of children with differences equal to or less than 3 S. U.
7–9	1,686	3.918±0.046	2.709	76.22
10–11	2,535	3.918±.037	2.018	80.08
12–13	3,841	3.329±.026	2.116	86.07
14 and over	5,897	3.236±.019	1.936	87.25

It is pertinent in this analysis to attempt to differentiate between chronological age and mental age. As expected, changes in the variability of response to repeated 4 A tests are associated with school grade. From the data presented in table 7, it may be noted that the standard deviation and mean deviation for the high-school children are, respectively, 20 percent and 31 percent lower than those found for the elementary school children. For the former group, the percentage of children whose scores in the two tests differed by not more than 3 S. U. is 88; for the latter, 78. Before an interpretation of these results can be attempted it is necessary to learn whether the primary factor involved is age or school grade, i. e., whether the decrease in variability is associated with increased education, with physical and mental maturity, or with both. The statistical constants calculated for each age and school group are presented in table 8.

TABLE 7.—*School grade and differences between scores of first and second tests (score of second test minus score of first test)*

School grade	No. of children	Standard deviation of differences	Mean deviation of differences	Percent of children with differences equal to or less than 3 S. U.
Elementary school, 3–6 grades	4,595	3.967±0.028	2.680	78.35
Junior high school, 7–8 grades	4,293	3.430±.025	2.091	86.58
High school, 9–12 grades	5,060	3.189±.021	1.848	87.87

TABLE 8.—*Difference between scores of first and second tests according to age and school grade (score of second test minus score of first test)*

Grade	Standard deviation of differences				Mean deviation of differences				Percent of children with differences equal to or less than 3 S.U.			
	7-9	10-11	12-13	14+	7-9	10-11	12-13	14+	7-9	10-11	12-13	14+
Elementary school, 3-6 grade	3.92	3.0[illegible]	3.08		2.68	2.12	2.7[illegible]		[illegible]	[illegible]	79.37	-
Junior high school, 7-8 grade		3.61	[illegible].18	3.21		2.[illegible]	2.01	2.1[illegible]		[illegible]	[illegible]7.39	86.05
High school, 9-12 grades			2.[illegible]	3.23			1.11	1.[illegible]			90.58	87.75

The results are definite. For each age group the variability decreases with advance in the grade group, but for each grade group the trend of the constants in relation to increasing age is irregular. As is also seen in the preceding tables, the most marked difference in variability is observed between the children who are below 12 years of age in elementary grades, and the children who are 12 years old and above, in the higher grades.

In view of these findings, it is of interest to determine whether or not the differences in the responses to intelligence tests are related to the variability in the scores made with a 4 A audiometer. This information is available for only 7,449 children, most of whom are in the junior and senior high school grades. The intelligence quotients found for these children have been grouped in the following broad categories: (*a*) Children with intelligence quotients less than 90, corresponding to Pintner's (19) backward class; (*b*) children with intelligence quotients between 90 and 119, normal and bright children; and (*c*) very bright and superior children, with an intelligence quotient equal to 120 and above. In table 9 are presented the constants of hearing variability for these three groups. There is very little difference between the normal and backward children, but there is a marked and significant decrease in variability of the superior group of children when compared with either of the other groups.

TABLE 9.—*Intelligence quotient and difference between first and second tests (score of second test minus score of first test)*

Intelligence quotient	Number of children	Standard deviation of differences	Mean deviation of differences	Percent of children with difference equal to or less than 3 S.U.
Backward child, I. Q. 60-89	860	3.142±0.051	1.809	86.28
Normal child, I. Q. 90-119	5,666	3.120±0.020	1.813	88.35
Superior child I. Q. 120+	923	2.808±0.044	1.541	91.22

The significance of these findings appears to be that the 4 A audiometer measures abilities other than that of hearing, and that tests

with this instrument give reasonably consistent results only when they are conducted on children already past the elementary school grade, and of high intelligence. A consideration of the nature of the test made with this instrument confirms the validity of this view. The test consists in listening to and noting the numbers spoken at a constant rate of speed by an adult. Conditions of hearing and attention being equal, the responses to the test will be dependent upon ability to understand speech, familiarity with numbers, and the individual reaction time to the mental stimulus. The findings presented show that these elements are of importance in determining the consistency of response. On the basis of these results, the observations of the authors mentioned above are better understood and explained. It does not seem likely that the alleged hearing impairment found when children are tested with this instrument causes inferior school work, retardation in school, etc.; it is rather that these conditions influence the results of tests. Practical experience in the individual testing of hearing with an instrument such as the 2 A audiometer indicates, furthermore, that while it costs much time and labor to obtain a reliable and consistent response from a mentally dull person, the incidence and degree of hearing impairment is probably no higher than in intelligent persons.

SIGNIFICANCE OF HEARING LOSS, MEASURED WITH A 4–A AUDIOMETER IN TERMS OF DECREASED ACUITY FOR PURE TONES

The use of a certain limit, such as 9 S.U., as a dividing line between good and impaired hearing appears to be based mostly on theoretical expectations and on observations made on selected individuals under laboratory conditions. The conditions under which the examination of children is usually conducted differ, however, from those found in the physics or otological laboratory. The significance of the degree of hearing loss which is revealed by a 4 A test may be evaluated empirically by studying the relationship between hearing loss, as measured by the 4 A audiometer, and the threshold of acuity for pure tones as measured by the 2 A audiometer. Records for air conduction made with a 2 A audiometer on some 1,400 of the above-mentioned children have been utilized for this purpose. These records have been grouped according to the best score made by each ear in either of the two 4-A tests. For each degree of hearing loss, the mean threshold for 256, 512, 1024, and 2048 d. v. (double vibrations), respectively, has been calculated. The results are shown in table 10. It is to be noted that, on the average, as the hearing loss increases, the limen of each of these auditory frequencies is also raised. This decrease in acuity for pure tones in not regular, however, nor is it proportional to the increase in hearing loss. The fact that there is not a linear or any other simple functional relationship between the

two variables is shown more clearly in figure 1. Here, for each of the four auditory frequencies, the mean threshold of those ears with a hearing loss of −3 S.U., is taken as 0, and the ordinate presents the scale of increase in limen from this mean, measured in decibels with the 2 A audiometer. On the abscissa is represented the degree of hearing loss found by means of the 1 A audiometer. For example, in table 10 it is found that, for children with a hearing loss of 12 S.U. as measured with the 1 A audiometer, the mean threshold at 512 d. v. is 18.63 db (decibels). This is an increase of only 6.40 db. above the mean threshold found for children with −3 S.U. hearing loss. Thus the graphic representation shows that, for children with a hearing loss of 12 S.U., the increase in mean limen for this particular auditory frequency is only 6.40 db. (18.63 db. − 12.23 db.).

TABLE 10.—*Mean threshold measured with 2 A audiometer for each degree of hearing loss*

Hearing loss in sensation units (1 A audiometer)	Mean threshold in decibels: Auditory frequencies in double vibrations				Hearing loss in sensation units (1 A audiometer)	Mean threshold in decibels: Auditory frequencies in double vibrations			
	256	512	1,024	2,048		256	512	1,024	2,048
−3	8.05	12.23	8.11	4.56	15	21.06	[illegible]	26.11	24.22
0	10.39	14.27	10.61	7.51	18	28.81	[illegible]	31.11	28.33
3	10.56	14.67	11.11	7.86	21	28.13	[illegible]	[illegible]	41.38
6	11.40	15.51	11.73	8.68	24	32.70	[illegible]	[illegible]	40.63
9	12.61	16.92	13.78	11.25	27	[illegible]	40.00	40.00	55.00
12	13.81	18.63	16.61	14.41	30	49.33	[illegible]	[illegible]	51.58

From figure 1 it is seen that the relationship between raised threshold and increase in hearing loss is practically the same for each of the four auditory frequencies; the small number of ears with a hearing loss above 18 and below 30 S.U. may account for the differences observed in this region. The most important fact brought out in the figure is, however, that the increase in mean threshold for the pure tones is very slight until the hearing loss reaches 15 S.U. That is, ears with a hearing loss from 0 to 12 S.U. show only a slight increase in mean threshold in relation to increased hearing loss. On the other hand, those with a hearing loss of 15 S.U. have a mean limen one and one-half to two times as high as those with 12 S.U. hearing loss. Due to the conditions of testing, the slight loss of acuity for pure tones shown by the children with hearing loss up to 12 S.U. has little if any pathologic significance, as can be deduced from the observations of Crowe et al. (6) (*cf.* also Polvogt (20) and Ciocco (4, 5)). The abrupt increase in the mean threshold found between 12 and 15 S.U. hearing loss seems clearly to confirm this conclusion.

It is not surprising, therefore, that a careful clinical examination fails in many cases to reveal any hearing impairment, even though the child has a hearing loss of 9 S.U. or more. This is obviously due to the fact that 9 S.U. is not the appropriate dividing point between

good and impaired hearing, at least when the 4-A tests are made under conditions such as those of this survey. Consequently, the reports on the incidence of hearing impairment in childhood should be accepted with reservation. Moreover, the data presented here

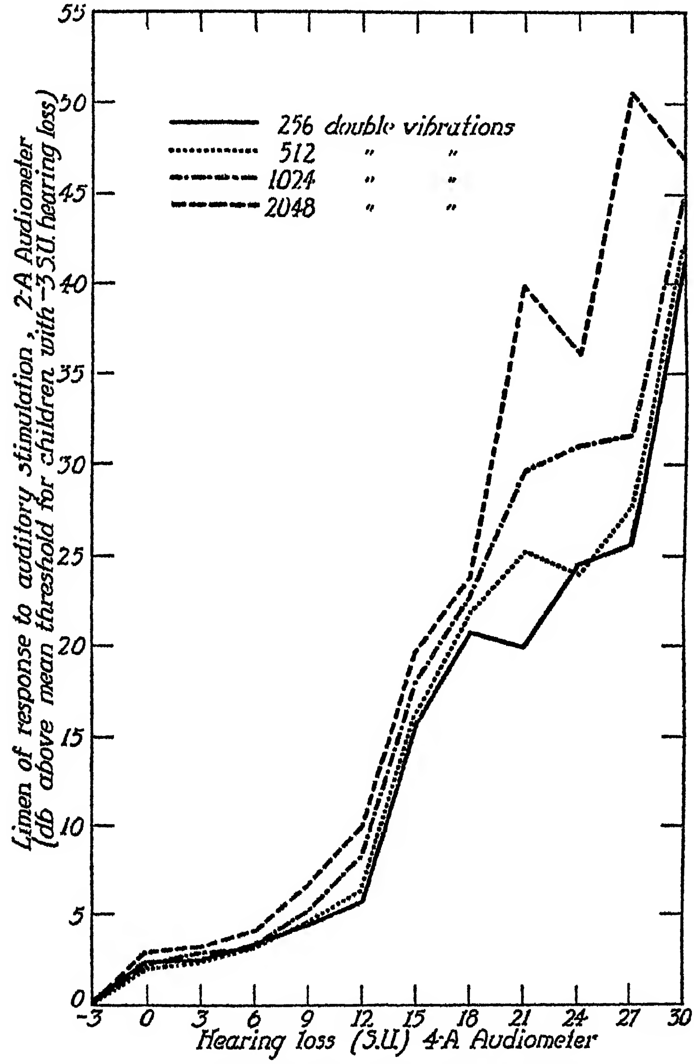

FIGURE 1.—Relationship between hearing acuity measured with a 2-A audiometer and hearing loss measured with a 4-A audiometer.

appear to indicate that a hearing loss of 12 S.U. is still within the "normal" range of individual variation. But, before this or any other figure can be finally accepted, it is necessary to obtain more precise knowledge regarding the precision and reliability of tests made with a 4-A audiometer.

SUMMARY AND DISCUSSION

A statistical analysis of the differences between the scores of two successive tests made with a 4-A audiometer on about 14,000 Washington (D. C.) school children shows the following facts:

1. The distribution curve of the differences between tests is symmetrical and leptokurtic. The normal range of variation (mean $\pm\sigma$) is almost 8 S.U. The mean difference between tests is approximately 3 S.U. Twenty percent of the children showed a difference greater than 3 S.U. between the first and second test.

2. Children with the best hearing show the least variation in successive tests, the degree of variation increasing with increase in hearing loss. Also, the variability is significantly lowered if only the better hearing ear is used.

3. Boys and girls are, on the average, equally consistent in successive tests.

4. Repeated tests on children in junior and senior high school grades are significantly and markedly less variable than those on children in the elementary school grades. The apparent influence of age on the variability of the test is found, on detailed analysis, to be due primarily to the relationship between age and school grade.

5. Children whose intelligence quotients are 120 or higher give significantly less variable responses than children with intelligence quotients between 90–119 or children with intelligence quotients less than 90. The children of the last two groups are, on the average, equally consistent.

A study of some 1,400 children on the relationship between hearing acuity for pure tones, as measured with a 2–A audiometer, and hearing loss, as measured with a 4–A audiometer, reveals the following facts:

1. Decrease in acuity for the four most important tones in the conversational range is not proportional to increase in hearing loss as determined by the 4–A audiometer, nor is there apparently a linear or other simple functional relationship between the two variables.

2. The mean threshold of response to the pure tones is only slightly raised when the loss of hearing, as measured by the 4–A instrument, increases from 0 to 12 S. U. Increase in loss of hearing from 12 to 15 S. U. as determined by the 4–A audiometer is, however, accompanied by a marked elevation in the threshold for pure tones. From these and other findings it appears that a 4–A audiometer record of 12 S. U. or less does not indicate significant pathology. A score of 15 S. U. loss may be regarded, however, as being abnormal.

Specific conclusions drawn from the items here summarized have been discussed above in appropriate sections. Taken altogether, however, these facts point specifically to the definite limitations of hearing surveys made with the 4–A audiometer. At the present time, most hearing surveys made with the 4–A audiometer are inade-

quate because the records obtained are not comparable with those obtained in the clinic and because it is the general rule to give complete clinical tests only to children with a certain degree of hearing loss. The procedure of not giving the complete examination to all children eliminates those children with good hearing at the time of the test. If these children should be found with impaired hearing some time later, the previous test can contribute nothing except the probable time of onset of the disease.

From quite another standpoint, it is pertinent also to recall the opinion of G. E. Shambaugh (26) regarding these surveys:

> " * * * too much emphasis has been placed on the point that if these examinations are regularly performed on young children by detecting the onset of the deafness in its earliest stage, much can be done toward preventing that type of chronic progressive deafness which in adults develops into a serious handicap. This is not a fair statement of the proposition. Diseases of the ear in children are of several types; the first is congenital deafness This, of course, we cannot correct, improve, or retard. Then there is nerve degeneration, toxic in origin and dependent on infections. Detection of this does not give us any clue that will assist in treatment. The treatment of the suppurative diseases of the middle ear does not influence the defect in the hearing to any great extent, a fact of which we are all aware. Then comes the tubotympanic processes, most common of all ear troubles in children. It is a common error to suppose that these processes so common in childhood are responsible for those cases of progressive deafness which in middle life produce a serious handicap. The tybotympanic disease of childhood is rarely prolonged as an active process into middle life. The chronic progressive deafness of adults may, of course, develop in a person in whose childhood there has been some tubotympanic process, but this does not mean that it is dependent on this for its cause."

Shambaugh's opinion regarding the prognosis of tubotympanic deafness in childhood is not universally accepted, nor has it been proved that all the cases of nerve degeneration found in children are infectious in origin. These are questions of vital importance which can be solved only by further studies on children. Thus it appears that the very important problem of prevention of deafness should be reexamined with much greater care, since, though millions of children have been tested, the mode of onset of the supposedly curable forms of deafness is still unknown. It is not intended by this criticism to deny the utility of the surveys which have made children, their parents and teachers "hearing conscious." On the other hand, it must be emphasized that surveys are not an end in themselves. The primary objective of these surveys should be, from the public-health standpoint at least, the initiation of an adequate program for the prevention of deafness, and this can be accomplished only by careful and complete clinical examinations.

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DEATHS DURING WEEK ENDED SEPTEMBER 19, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 19, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,142	[illegible] 402
Deaths per 1,000 population, annual basis	10.0	10.3
Deaths under 1 year of age	512	507
Deaths under 1 year of age per 1,000 estimated live births	46	47
Deaths per 1,000 population, annual basis, first 38 weeks of year	12.3	11.5
Data from industrial insurance companies:		
Policies in force	68,465,466	67,580,404
Number of death claims	11,391	10,872
Death claims per 1,000 policies in force, annual rate	8.7	8.4
Death claims per 1,000 policies, first 38 weeks of year, annual rate	10.0	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Sept. 26, 1936, and Sept. 28, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 26, 1936, and Sept. 28, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935
New England States:								
Maine	1	3	1		32		1	0
New Hampshire					5		0	0
Vermont					6	8	0	0
Massachusetts	8	6			25	12	1	1
Rhode Island		1			6	2	0	1
Connecticut		3		3	4	0	1	0
Middle Atlantic States:								
New York	26	27	[1] 11	[1] 15	39	63	6	8
New Jersey	5	15	5	7	16	67	0	2
Pennsylvania	28	30			80	28	3	7
East North Central States:								
Ohio	23	40	3	10	50	10	3	2
Indiana	10	68	10	22	2	4	1	1
Illinois	11	60	3	9	12	11	5	4
Michigan	13	31		5	10	20	1	2
Wisconsin	2		12	28	11	38	1	1
West North Central States:								
Minnesota	8	2	1		10	7	1	0
Iowa	2	10			2	1	1	1
Missouri	3	52	58	28	1	18	1	1
North Dakota		2	10		2	4	0	0
South Dakota	1				2		0	0
Nebraska	3	8		1	1	6	0	0
Kansas	7	16			2	5	0	0
South Atlantic States:								
Delaware				1	3	6	0	0
Maryland [2, 3]	13	14	3	3	0	7	3	1
District of Columbia	14	17		1	4	1	0	3
Virginia [3]	30	38			5	4	6	2
West Virginia	14	45	2	20	2	6	2	1
North Carolina [4]	81	66	5	5	4	9	1	0
South Carolina [4]	23	21	130	170		1	0	0
Georgia [3, 4]	47	35					2	0
Florida [4]	8	9	2		1	8	3	0
East South Central States:								
Kentucky	14	50	1	2	9	44	6	4
Tennessee	43	47	11	30	2	18	1	2
Alabama [4]	48	44	3	9		8	2	2
Mississippi [3]	22	31					1	0

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 26, 1936, and Sept. 28, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935
West South Central States								
Arkansas	4	13	3	10			0	1
Louisiana	16	22	3	5	1	3	0	1
Oklahoma [4]	4	23	8	27		1	0	1
Texas [4]	31	72	19	30		10	0	0
Mountain States								
Montana	2	5	8	6		5	1	0
Idaho		1	2				0	0
Wyoming		1			2	8	0	0
Colorado	3	10			2	6	5	0
New Mexico	1	4	1	2	20		0	0
Arizona	2	2	9	18	8	2	0	0
Utah [2]					1	1	0	0
Pacific States								
Washington	2	1	1		7	13	0	0
Oregon	1		13	18	2	118	2	1
California [4]	22	20	29	24	82	87	1	2
Total	560	995	373	539	352	672	62	52
First 39 weeks of year	17,773	22,422	113,202	100,475	272,221	698,966	6,502	4,515

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935	Week ended Sept. 26, 1936	Week ended Sept. 28, 1935
New England States								
Maine	6	14	7	3	0	0	2	2
New Hampshire	0	4	6	1	0	0	0	0
Vermont	0	7	4	6	0	0	0	0
Massachusetts	1	88	50	59	0	0	3	3
Rhode Island	0	32	13	10	0	0	0	0
Connecticut	3	33	10	13	0	0	1	5
Middle Atlantic States								
New York	16	150	130	173	0	0	25	26
New Jersey	2	51	16	35	0	0	10	12
Pennsylvania	1	15	110	188	0	0	22	34
East North Central States								
Ohio	27	7	99	157	0	0	30	35
Indiana	7	1	60	86	0	0	8	14
Illinois	75	14	107	217	5	1	29	33
Michigan	0	30	88	51	1	0	11	20
Wisconsin	4	4	76	145	0	1	2	5
West North Central States:								
Minnesota	3	2	19	83	0	0	3	6
Iowa	7	3	12	41	2	0	2	7
Missouri	2	2	12	59	0	0	17	10
North Dakota	2	0	7	12	4	4	2	1
South Dakota	1	0	6	10	0	1	2	0
Nebraska	3	1	14	21	0	4	1	0
Kansas	4	4	31	27	0	8	5	10
South Atlantic States.								
Delaware	0	0	0	9	0	0	1	3
Maryland [2 3]	5	13	12	28	0	0	16	17
District of Columbia	1	7	4	14	0	0	2	2
Virginia [3]	3	10	15	34	0	0	26	20
West Virginia	4	0	30	81	0	0	24	25
North Carolina [4]	1	15	45	60	0	0	31	24
South Carolina [4]	0	1	8	10	0	0	20	11
Georgia [3 4]	11	0	15	23	0	0	21	26
Florida [4]	0	1	2	4	0	0	5	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 26, 1936, and September 28, 1935—Continued

Division and State	Poliomyelitis: Week ended Sept. 26, 1936	Poliomyelitis: Week ended Sept. 28, 1935	Scarlet fever: Week ended Sept. 26, 1936	Scarlet fever: Week ended Sept. 28, 1935	Smallpox: Week ended Sept. 26, 1936	Smallpox: Week ended Sept. 28, 1935	Typhoid fever: Week ended Sept. 26, 1936	Typhoid fever: Week ended Sept. 28, 1935
East South Central States:								
Kentucky	1	11	27	[illegible]	1	0	28	62
Tennessee	2[illegible]	1	27	13	0	0	35	33
Alabama [4]	6	1	13	14	0	0	12	20
Mississippi [2]	3	0	15	20	0	0	17	7
West South Central States:								
Arkansas	1	4	6	18	0	1	10	13
Louisiana	1	1	1	5	0	0	3	27
Oklahoma [5]	0	0	10	8	0	0	12	18
Texas [4]	2	1	15	11	0	1	21	47
Mountain States:								
Montana	1	0	29	31	1	0	10	2
Idaho	0	0	9	[illegible]	0	0	4	10
Wyoming	0	0	1	11	0	5	1	0
Colorado	9	1	15	21	0	5	10	4
New Mexico	4	0	[illegible]	8	0	0	21	20
Arizona	0	1	5	8	0	0	0	0
Utah [2]	0	0	7	18	0	0	0	8
Pacific States:								
Washington	5	0	10	[illegible]	1	2	4	5
Oregon	5	3	1[illegible]	37	0	0	2	4
California [4]	18	20	93	110	0	0	13	21
Total	277	[illegible]	1,[illegible]	2,210	10	[illegible]	[illegible]	650
First 39 weeks of year	2,669	8,707	190,016	189,074	6,2[illegible]1	5,181	10,111	13,451

1 New York City only.
2 Week ended earlier than Saturday.
3 Rocky Mountain spotted fever, week ended Sept. 26, 1936, 3 cases, as follows: Maryland, 1; Virginia, 1; Georgia, 1.
4 Typhus fever, week ended Sept. 26, 1936, 58 cases, as follows: North Carolina, 1; South Carolina, 2; Georgia, 38; Florida, 1; Alabama, 5; Texas, 9; California, [illegible].
5 Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1936										
Kentucky	31	13	5	7	50		7	50	0	106
August 1936										
Hawaii Territory	1	8	2		8		0	1	0	4
Idaho		1			12		4	19	8	7
Kansas	2	24	1	3	10	1	3	132	2	52
Kentucky	19	26	12	8	41		22	34	1	195
Louisiana	7	89	71	213	11	13	8	27	0	114
Montana	9	5	8	1	1		2	36	60	22
New Hampshire							0	2	0	2
Oregon	2	2	20	17	20		4	30	2	12
South Dakota	1	2	8		19		8	81	9	7
Vermont		1			5			11	0	0
Virginia	12	49	95	93	102	18	18	48	0	93
Washington	1	4	13	1	48		14	57	8	7
Wisconsin	2	6	32		62		2	251	2	7

July 1938

	Cases
Kentucky	
Mumps	[illegible]
Whooping cough	1[illegible]

August 1938

	Cases
Anthrax	
Kansas	1
South Dakota	1
Chickenpox	
Hawaii Territory	10
Idaho	10
Kansas	[illegible]
Montana	18
Oregon	[illegible]4
South Dakota	
Vermont	[illegible]0
Virginia	1[illegible]
Washington	[illegible]
Wisconsin	[illegible]4
Dysentery	
Hawaii Territory (amoebic)	[illegible]
Kansas (amoebic)	[illegible]
Kansas (bacillary)	[illegible]
Louisiana (amoebic)	[illegible]
Oregon (amoebic)	1
Virginia (diarrhea included)	1,225
Wisconsin (amoebic)	1
Epidemic encephalitis	
Kansas	4
Louisiana	[illegible]
Montana	13
Oregon	
Washington	[illegible]
Wisconsin	1
German measles	
Kansas	3
Vermont	7
Washington	14
Wisconsin	22
Hookworm disease	
Louisiana	4
Impetigo contagiosa	
Kansas	1
Montana	1
Oregon	13

August 1938—Continued

	Cases
Leprosy	
Hawaii Territory	1
Mumps	
Hawaii Territory	13
Idaho	13
Kansas	18
Kentucky	12
Montana	3[illegible]
Oregon	3
South Dakota	8
Vermont	20
Virginia	3
Washington	[illegible]0
Wisconsin	11[illegible]
Ophthalmia neonatorum	
Louisiana	4
Virginia	1
Wisconsin	2
Paratyphoid fever	
Louisiana	3
Oregon	2
Virginia	11
Washington	1
Rabies in animals	
Louisiana	21
Oregon	3
Washington	8
Rabies in man	
South Dakota	1
Rocky Mountain spotted fever	
Idaho	1
Montana	3
Oregon	3
Virginia	20
Scabies	
Oregon	6
Septic sore throat	
Kansas	2
Louisiana	6
Montana	3
Oregon	8
Virginia	27
Washington	1
Wisconsin	13

August 1938—Continued

	Cases
Tetanus	
Louisiana	1
South Dakota	1
Virginia	5
Trachoma	
Oregon	1
South Dakota	2
Virginia	1
Wisconsin	1
Tularaemia	
Kansas	2
Louisiana	[illegible]
Oregon	[illegible]
Virginia	[illegible]
Wisconsin	2
Typhus fever	
Hawaii Territory	[illegible]
Louisiana	4
Virginia	1
Undulant fever	
Kansas	10
Louisiana	[illegible]
South Dakota	1
Vermont	4
Virginia	[illegible]
Washington	5
Wisconsin	[illegible]
Vincent's infection	
Kansas	16
Oregon	1[illegible]
Washington	1
Whooping cough	
Hawaii Territory	14
Idaho	6
Kansas	[illegible]1
Kentucky	[illegible]
Louisiana	[illegible]3
Montana	61
Oregon	143
South Dakota	[illegible]
Vermont	98
Virginia	144
Washington	[illegible]6
Wisconsin	486

WEEKLY REPORTS FROM CITIES

This table [illegible] the purpose of [illegible] in the table [illegible] reference

State and city	Diphtheria cases	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Whooping cough cases	Deaths, all causes
Maine:											
Portland	0		0	1	1	0	[illegible]	1	0	1	20
New Hampshire:											
Concord	0		0	[illegible]	0	0	0	0	0	0	6
Manchester	0		0	0	0	0	[illegible]	0	0	0	15
Nashua	0			0		1	0		0	0	--
Vermont:											
Barre	0		0	0	0	0	0	1	0	0	3
Burlington	0		0	0	[illegible]	0	0	0	0	0	10
Rutland	0		0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	0		0	2	9	11	0	1	0	80	170
Fall River	0		0	0	1	0	0	0	0	0	29
Springfield	0		0	0	1		0	1	0	[illegible]	27
Worcester	1		0	[illegible]	1	0	0	[illegible]	0	16	37
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	1	0	15
Providence	0		0	0	[illegible]	1	0	1	1	11	61
Connecticut:											
Bridgeport	0		0	0	[illegible]	1	0	0	0	[illegible]	24
Hartford	0		0	0	1	1	0	1	0	8	43
New Haven	0	[illegible]	0	0	3	0	0	0	0	[illegible]	38
New York:											
Buffalo	1		0	1	7	11	0	[illegible]	0	11	118
New York	10	2	1	41	[illegible]	25	0	[illegible]	10	110	1,173
Rochester	0		0	0	4	0	0	0	1	3	51
Syracuse	0		0	0	0	1	0	0	0	21	42
New Jersey:											
Camden	1	1	0	0	0	0	0	0	[illegible]	1	30
Newark	0		0	0	1	2	0	8	0	20	74
Trenton	0		0	0	1	1	0	[illegible]	2	2	37
Pennsylvania:											
Philadelphia	1	3	1	2	12	12	0	[illegible]	[illegible]	[illegible]	387
Pittsburgh	2	2	1	0	11	[illegible]	0	10	2	15	115
Reading	0		0	0	0	2	0	0	0	[illegible]	21
Scranton	[illegible]			0		1	0		0	0	
Ohio:											
Cincinnati	3		0	0	5	2	0	7	0	5	126
Cleveland	[illegible]	1	1	1	8	11	0	11	1	[illegible]	159
Columbus	1		0	0	1	1	0	[illegible]	[illegible]	20	95
Toledo	1		0	[illegible]	3	1	0	1	0	11	66
Indiana:											
Anderson	0		1	0	0	2	0	1	0	0	9
Fort Wayne	1		0	0	0	4	0	1	0	1	28
Indianapolis	1		0	0	7	0	0	1	1	7	84
Muncie	0		0	0	0	0	0	0	0	0	9
South Bend	0		0	0	2	1	0	1	0	0	15
Terre Haute	0		0	0	0	2	0	0	0	0	16
Illinois:											
Alton	0		0	0	0	0	0	0	0	0	3
Chicago	1	2	1	0	21	28	0	33	[illegible]	41	617
Elgin	0		0	0	3	0	0	0	0	2	11
Moline	0		0	0	1	0	0	0	0	2	11
Springfield	0		0	2	3	2	0	0	0	5	13
Michigan:											
Detroit	1		0	5	8	17	0	20	1	108	224
Flint	0		0	0	0	2	0	1	1	8	16
Grand Rapids	0	-	0	0	0	8	0	0	0	9	22
Wisconsin:											
Kenosha	0	---	0	1	0	0	0	0	0	0	5
Madison	0		0	0	0	0	0	0	0	8	20
Milwaukee	0	1	1	1	2	16	0	1	0	42	83
Racine	0	----	0	0	0	2	0	1	0	0	11
Superior	0	------	0	0	0	3	0	0	0	13	5
Minnesota:											
Duluth	0	------	0	0	1	2	0	2	0	7	18
Minneapolis	1	---	1	2	5	8	0	0	0	18	93
St. Paul	0	-----	0	3	3	1	0	3	0	20	42
Iowa:											
Cedar Rapids	0	------	--------	0	-------	0	0	----	0	0	--------
Davenport	0	-----	--------	0	-----	0	0	----	0	0	-----
Des Moines	1	----	--------	1	-----	1	0		2	0	24

City reports for week ended Sept. 19, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa—Continued											
Sioux City	0			0		1	[illegible]		0	[illegible]	---
Waterloo	1			0		1	0		0	7	-
Missouri											
Kansas City	1		0	0	[illegible]	3	0		1	0	78
St. Joseph											
St. Louis	1		0	0	8	7	0	5	2	18	178
North Dakota											
Fargo	0		0	0	0	0	0	0	0	0	7
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	2
South Dakota											
Aberdeen	0			1		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	14
Nebraska											
Omaha	[illegible]		0	1	[illegible]	1	0	2	1	1	53
Kansas											
Lawrence	0		0	0	1	1	0	0	0	0	4
Topeka	0		0	0		1	0	0	1	0	11
Wichita	0		0	0	[illegible]	1	0	0	1	0	12
Delaware											
Wilmington	0		0	1	1	0	0	0	0	1	24
Maryland											
Baltimore	1	1	0	[illegible]	12	7	0	10	2	1[illegible]	190
Cumberland	0		0	0	0	0	0	1	0	0	12
Frederick	0		0	0	0	0	0	0	0	0	2
District of Columbia											
Washington	[illegible]		0	0	10	9	0	8	0	37	133
Virginia											
Lynchburg	0		0	1	2	0	0	1	0	8	12
Norfolk	[illegible]		0	0	1	1	0	0	1	2	19
Richmond	0		0	0	4	[illegible]	0	3	1	1	50
Roanoke	[illegible]		0	0	0	0	0	0	1	3	13
West Virginia											
Charleston	0		0	1	0	0	0	0	1	0	7
Huntington	0			0		2	0		0	0	
Wheeling	0		0	1	1	2	0	0	0	1	11
North Carolina											
Gastonia	0			0		1	0		0	0	-
Raleigh											
Wilmington	0		0	0	0	0	0	0	0	1	13
Winston-Salem	0		0	0	2	3	0	0	0	0	11
South Carolina											
Charleston	2	1	0	0	3	0	0	0	2	0	20
Columbia											
Florence	0		0	0	1	0	0	0	0	0	20
Greenville	1		0	0	0	0	0	0	0	0	8
Georgia											
Atlanta	[illegible]	[illegible]	[illegible]	0	[illegible]	1	0	6	1	0	70
Brunswick	0		0	0	0	0	0	0	0	0	6
Savannah	3		0	0	1	0	0	6	1	0	32
Florida											
Miami	0	2	1	0		0	0	0	0	0	27
Tampa	0	[illegible]	1	0	0	0	0	2	0	8	19
Kentucky											
Ashland	0			0		1	0		2	0	18
Covington	0		0	0	0	0	0	0	0	0	12
Lexington	0		0	0	0	0	0	1	1	0	19
Louisville											
Tennessee											
Knoxville	3		0	0	2	1	0	2	0	0	28
Memphis	[illegible]		0	1	2	4	0	3	0	8	57
Nashville	1		0	0	0	3	0	2	8	0	47
Alabama											
Birmingham	0	1	0	0	4	0	0	2	3	1	67
Mobile	1		0	0	1	0	0	2	0	0	24
Montgomery				0		0	0		0	0	-
Arkansas											
Fort Smith	1			0		0	0		0	0	-
Little Rock	0		0	0	3	0	0	1	0	0	6
Louisiana											
Lake Charles	0		0	0	1	1	0	1	0	0	4
New Orleans	4	1	1	0	6	1	0	15	0	0	146
Shreveport	1		0	0	7	0	0	3	1	0	46
Oklahoma											
Oklahoma City	1	-	0	0	0	0	0	0	2	0	44
Tulsa	1			1		0	0		0	0	---

City reports for week ended Sept. 14, 1918—Continued.

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
Texas:											
Dallas	2	1	1	0	[illegible]	0	0	1	0	4	55
Fort Worth	0		0	0	0	0	1	0	0	0	33
Galveston	0		0	0	1	0	0	1	0	0	12
Houston	2		0	0	[illegible]	[illegible]	0	8	1	2	85
San Antonio	1		1	0	[illegible]	0	0	[illegible]	1	0	42
Montana:											
Billings	0		0	0	1	0	0	0	0	0	6
Great Falls	0		0	0	1	0	1	0	0	1	6
Helena	0		0	1	0	0	0	0	1	0	8
Missoula	0		0	0	0	0	0	0	0	1	4
Idaho:											
Boise	0		0	0	0	0	0	0	0	0	9
Colorado:											
Colorado Springs	0		0	0	1	0	0	0	1	0	12
Denver	1		1	1	2	8	0	6	1	43	79
Pueblo	0		0	0	0	4	0	1	1	0	10
New Mexico:											
Albuquerque	0		0	0	1	0	0	1	0	0	17
Utah:											
Salt Lake City	1		0	1	2	2	0	1	0	1	21
Nevada:											
Reno	......										......
Washington:											
Seattle	0		0	3		2	0		1	5	
Spokane	0		0	1	2	4	2	1	0	1	24
Tacoma	0		0	0	1	1	0	2	0	0	31
Oregon:											
Portland	1	1	0	1	3	5	0	4	1	6	72
Salem	0			0		0	0		0	0	
California:											
Los Angeles	10	16	0	6	13	9	0	18	1	33	277
Sacramento	2	----	0	1	2	3	0	3	0	36	20
San Francisco	1	1	0	1	10	13	0	6	0	8	149

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases	State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:				Maryland:			
Worcester	0	1	0	Baltimore	1	0	2
New York:				Virginia:			
Buffalo	0	1	0	Lynchburg	0	0	1
New York	1	1	4	Georgia:			
Rochester	1	0	2	Atlanta	1	0	1
Pennsylvania:				Tennessee:			
Philadelphia	8	0	1	Knoxville	0	0	2
Reading	1	0	0	Memphis	0	1	1
Ohio:				Nashville	0	0	1
Cleveland	1	0	0	Alabama:			
Toledo	0	0	8	Birmingham	1	0	2
Indiana:				Louisiana:			
Indianapolis	0	0	1	New Orleans	1	1	0
Illinois:				Shreveport	0	0	1
Alton	0	0	1	Texas:			
Chicago	2	2	23	Houston	0	1	0
Michigan:				Colorado:			
Detroit	0	0	5	Denver	0	0	1
Wisconsin:				Oregon:			
Kenosha	0	0	1	Portland	0	1	0
Minnesota:				California:			
Minneapolis	0	0	1	Los Angeles	1	0	3
Iowa:							
Des Moines	0	0	1				
Missouri:							
Kansas City	0	0	1				
St. Louis	0	0	2				

Epidemic encephalitis.—Cases: Portland, Maine, 1; Philadelphia, 1; Davenport, 1; Albuquerque, 1.

Pellagra.—Cases: Winston-Salem, 1; Atlanta, 1; Savannah, 4, Memphis, 1, Montgomery, 6; New Orleans, 1; San Francisco, 1.

Rabies in man.—Deaths: Ashland, Ky., 1.

Typhus fever.—Cases: New York, 1; Chicago, 1; Wilmington, N. C., 1; Charleston, S. C., 1; Atlanta, 1; Tampa, 2; Birmingham, 1; Montgomery, 2, Los Angeles, 1.

FOREIGN AND INSULAR

CANADA

Manitoba—Poliomyelitis.—During the week ended September 26, 1936, 64 new cases of poliomyelitis had been reported in Manitoba, Canada, making a total of 220 cases of this disease since the outbreak. In Winnipeg, a total of 39 cases of poliomyelitis had occurred since June.

GERMANY

Vital statistics—First quarter 1936. Following are vital statistics for Germany for the first quarter of 1936.

Number of marriages	115,070	Total deaths	205,587
Number of marriages per 1,000 population	6.9	Deaths per 1,000 population	12.3
Number of live births	328,198	Deaths under 1 year of age	22,035
Number of live births per 1,000 population	19.6	Deaths under 1 year of age per 100 live births	7.0
Number of stillbirths	9,114		

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended June 27, 1936.—During the 13 weeks ended June 27, 1936, cases of certain infectious diseases were reported in England and Wales, as follows:

Disease	Cases	Disease	Cases
Diphtheria	11,611	Puerperal pyrexia	1,520
Ophthalmia neonatorum	1,218	Scarlet fever	21,068
Pneumonia	10,916	Typhoid fever	330
Puerperal fever	528		

England and Wales—Vital statistics—Second quarter 1936.—During the quarter ended June 30, 1936, 157,700 live births and 119,557 deaths were registered in England and Wales. The following vital statistics are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar General of England and Wales. The figures are provisional.

Birth and death rates in England and Wales, quarter ended June 30, 1936

Annual rates per 1,000 population:		Annual rates per 1,000 population—Con.	
Live births	15.6	Deaths from—con.	
Stillbirths	64	Diphtheria	.06
Deaths, all causes	11.8	Influenza	.12
Deaths under 1 year of age	[1] 54	Measles	.11
Deaths from		Scarlet fever	.01
Diarrhea and enteritis (under 2 years of age)	[1] 5.0	Violence	.51
		Whooping cough	.06

[1] Per 1,000 live births

ITALY

Communicable diseases—4 weeks ended July 19, 1936.—During the 4 weeks ended July 19, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	June 22-28		June 29-July 5		July 6-12		July 13-19	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	15	15	23	21	23	21	19	18
Cerebrospinal meningitis	8	6	14	14	11	12	12	11
Chicken pox	410	190	391	179	210	121	185	108
Diphtheria and croup	319	182	324	170	280	161	282	172
Dysentery	13	12	25	16	23	16	39	26
Hookworm disease	35	17	17	12	22	15	28	10
Lethargic encephalitis	1	1	1	1	5	5		
Measles	1,880	300	1,820	352	1,394	258	1,155	278
Mumps	200	97	201	111	210	100	201	98
Paratyphoid fever	68	51	85	60	89	61	124	95
Poliomyelitis	81	53	91	61	90	65	90	73
Puerperal fever	80	80	29	28	27	26	25	20
Scarlet fever	226	103	211	115	180	96	147	87
Typhoid fever	343	212	401	215	518	207	609	340
Undulant fever	94	67	95	71	88	54	93	63
Whooping cough	784	211	827	231	848	235	663	213

STRAITS SETTLEMENTS

Vital statistics—1935.—The following table shows the births and deaths reported in the Straits Settlements during the year 1935, together with the number of deaths reported from certain notifiable diseases.

Population	1,117,023
Number of births	46,649
Births per 1,000 population	41.76
Number of deaths	28,050
Deaths per 1,000 population	25.11
Infant mortality per 1,000 live births	165.28
Deaths from—	
Beriberi	916
Cancer	310
Diarrhea and enteritis	1,308
Dysentery	411
Heart diseases	630
Hookworm disease	41
Influenza	362
Leprosy	144
Malaria	1,698
Pneumonia	2,541
Smallpox	21
Syphilis	325
Tuberculosis	2,267
Typhoid fever	177

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving [illegible] of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for [illegible], pages [illegible]. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 30, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India (French)—Pondichery Territory.—During the week ended August 15, 1936, 1 case of cholera was reported in Pondichery Territory, India (French).

Plague

Algeria—Oran Department.—During the week ended September 19, 1936, 1 suspected case of plague was reported in Oran Department, Algeria.

Brazil.—According to information dated August 31, 1936, plague has been reported since January in Brazil as follows: Bahia State, 46 cases, 14 deaths; Ceara State, 106 cases, 15 deaths; Pernambuco State, 45 cases, 10 deaths; Piauhy State, 4 cases, 2 deaths.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—Three rats found September 28, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

Peru.—During the month of August 1936, plague was reported in Peru as follows: Libertad Department, 1 case, 1 death; Lima Department, 2 cases, 1 death; Piura Department, 3 suspected cases. Plague-infected rats were also reported found in Callao, Peru.

Typhus Fever

Chile.—During the period June 27 to August 1, 1936, typhus fever was reported in Chile as follows: Aconcagua, 3 cases, 1 death; Arauco, 2 deaths; Bio Bio, 47 cases, 15 deaths; Cautin, 21 cases, 3 deaths; Chiloe, 1 case, 1 death; Colchagua, 15 cases, 3 deaths; Concepcion, 38 cases, 5 deaths; Coquimbo, 4 cases, 1 death; Maule, 3 cases; Nuble, 27 cases, 3 deaths; O'Higgins, 1 case; Santiago, 104 cases, 15 deaths; Valdivia, 1 case.

Finland.—During the period August 16–31, 1936, 1 case of typhus fever was reported in Finland.

Yellow Fever

Colombia.—Deaths from yellow fever have been reported in Colombia as follows: August 7, Puerto Wilches, 1; July 4 to August 9, Restrepo, 3; August 1–6, San Vincente de Chucuri, 4.

Dahomey—Bembereke.—During the period September 11–20, 1936, 1 suspected case of yellow fever was reported at Bembereke, Dahomey.

French Guinea—Macenta.—During the period September 11–20, 1936, 1 suspected case of yellow fever was reported in Macenta, French Guinea.

Nigeria—Owerri Province—Aba.—On September 19, 1936, 1 suspected case of yellow fever was reported in Aba, Owerri Province, Nigeria.

Sudan (French)—Koulikoro.—On September 18, 1936, 1 case of yellow fever was reported near Koulikoro, Sudan (French).

×

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

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PUBLIC HEALTH REPORTS

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LYSINE AND MALIGNANT GROWTH

I. THE AMINO ACID LYSINE AS A FACTOR CONTROLLING THE GROWTH RATE OF A TYPICAL NEOPLASM

By CARL VOEGTLIN, *Medical Director* and J. W. THOMPSON, *Associate Pharmacologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

The progressive proliferation of neoplastic tissues undoubtedly requires a continual synthesis of cell proteins. It is important, therefore, to determine the nature of the different chemical factors which are involved in this process in order to secure, if possible, information which will permit control of the growth of neoplasms. This problem can be attacked in different ways. In this paper, evidence will be presented which indicates that the amino acid lysine is one of the factors which controls the growth rate of a typical neoplasm.

In 1914 Osborne and Mendel showed that young rats fail to grow normally when fed on a diet deficient in lysine, and that the addition of lysine to the deficient diet is followed by rapid growth. The indispensability of lysine for normal growth was confirmed by subsequent workers (McGinty, Lewis, and Marvel, 1924–25). It appears that only the natural $l(+)$–lysine can be utilized by the rat for purposes of growth (Berg, C. P., and Dalton, J. L., 1934). Experiments with rats, as well as mice (Geiling, 1917), seem to indicate furthermore that lysine, though indispensable for growth, is not essential for the maintenance of body weight of young and adult animals.

Since lysine is essential for the proliferation of normal tissues, the question arises as to whether or not this amino acid is also essential for the proliferation of malignant tissues. In other words, is it possible to inhibit neoplastic growth by restricting the lysine supply to the tumor-bearing animal, and, if so, does the administration of lysine, following a preliminary period of inhibition, cause a marked acceleration in tumor growth rate.

EXPERIMENTAL

It is recognized that results obtained with spontaneous neoplasms are of greater significance for this kind of research than those obtained with transplanted tumors. Hence strain No. 3 mice of the

colony of the State Institute for the Study of Malignant Disease in Buffalo were secured through the courtesy of Dr. B. T. Simpson and Mr. M. C. Marsh. The characteristics of this mouse strain, derived from the well known Lathrop Loeb stock, are described by Marsh (1929). We have confirmed his findings, as in our breeding colony, established late in 1931, a very high percentage of the females developed mammary carcinoma. On an adequate stock diet the tumors show progressive growth, and so far we have failed to observe spontaneous regressions in many hundred tumor animals.

The animals of the breeding colony were maintained on a diet composed of 30 percent whole milk powder and 70 percent ground wheat. This was supplemented with 2 percent of NaCl of the wheat used. Lettuce was supplied as an additional source of vitamin E. This diet is essentially the same as that of Sherman for the breeding of rats. It was found that the addition of iron citrate in the proportion of 0.13 percent of the dry diet appeared to improve somewhat the condition of the animals.

By frequent examination of the mice, females showing small tumors were selected for the experiments. The growth rate of each individual tumor was determined by estimating the cross sectional area in square millimeters from 2 dimensions of the tumor, the measurements being made twice a week. This method of estimating the tumor growth rate, while not absolutely accurate, is quite reliable, as shown by the smoothness of the individual growth curves. Under normal conditions these curves, obtained by plotting the cross-sectional tumor area against time, are practically straight lines. The animals were weighed twice a week and the food was given *ad libitum.*

In this preliminary work no record was kept of the food consumption, except when mentioned in the following text. If, in the course of the experiments, a tumor ulcerated, the animal was discarded from further consideration, because hemorrhage and infection very often modify subsequent tumor growth. At the end of the experiments a careful autopsy was made, as well as a routine histological examination of the tumors, for the purpose of verifying their malignant nature. For the latter we are indebted to Passed Assistant Surgeon L. L. Ashburn. All of the tumors included in this investigation were mammary carcinomata of varying histological structure.

Since it was found that, under apparently constant dietary and environmental conditions, the tumor growth rate varies considerably from animal to animal and even among multiple tumors, it was decided to eliminate these individual differences by subjecting each animal for some time to the "lysine deficiency" and then give the lysine supplement during a subsequent period. This is one of the customary procedures used in experiments on normal growth. This

procedure has a decided advantage over other methods as it reduces the number of animals needed to secure conclusive results. This is particularly desirable when rather expensive chemicals are used, as in the present work. The dihydrochloride of the natural optical isomer of lysine was used and was prepared from the picrate by Dr. J. M. Johnson, senior chemist, National Institute of Health, to whom we are grateful for this assistance.

A diet partially deficient in available lysine was discovered accidentally in work having another object in view. It had been found that the stock diet minus the lettuce supplement promotes rapid growth of the tumor. However, if the whole milk powder before incorporation into the diet is heated in thin layers in a steam sterilizer at 15 pounds pressure for 1 hour and subsequently dried in a current of air, it is found that tumor growth on a diet prepared with this heated milk powder as a rule markedly slows up. This diet has the following composition: Heated milk powder 30 percent and ground wheat 70 percent, plus 2 percent of NaCl of the ground wheat used.

The dietary value of this mixture was systematically studied on normal young rats. It was found that this diet permits only slow growth (chart 1). Further experiments, which need not be detailed here, showed that supplementing the diet with an abundant amount of vitamins A, B_1, B_2, C, or D, and in combination, did not improve the growth rate. This suggested that the defect might be in the protein factor. Therefore, the diet was supplemented with various amino acids—cystine, histidine, arginine, or lysine. Some of the growth curves are given in chart 1, from which it is clearly seen that the addition of lysine promptly increases the growth rate of rats to almost the same rate as is obtained with the diet containing unheated milk powder (curve 1). In these experiments a record was kept of the daily food consumption, which showed that the increased growth rate of the rats following the incorporation of lysine into the diet could not be accounted for by an increase in the consumption of food during this period.

The results obtained with tumor mice were as follows:

Chart 2 (curves A) illustrates the most extreme variations observed in the growth rate of three primary tumors in one animal maintained on the diet containing *unheated* milk powder. Similar observations, though less striking, were made in other cases of multiple tumors.

The curves B of chart 2 are representative tumor growth curves from different animals also maintained on the diet containing *unheated* milk powder. These curves clearly show that this diet promotes rapid tumor growth.

Chart 3 shows that, in animals maintained on a diet containing the *heated* milk powder, the tumor growth rate is very much lower. If,

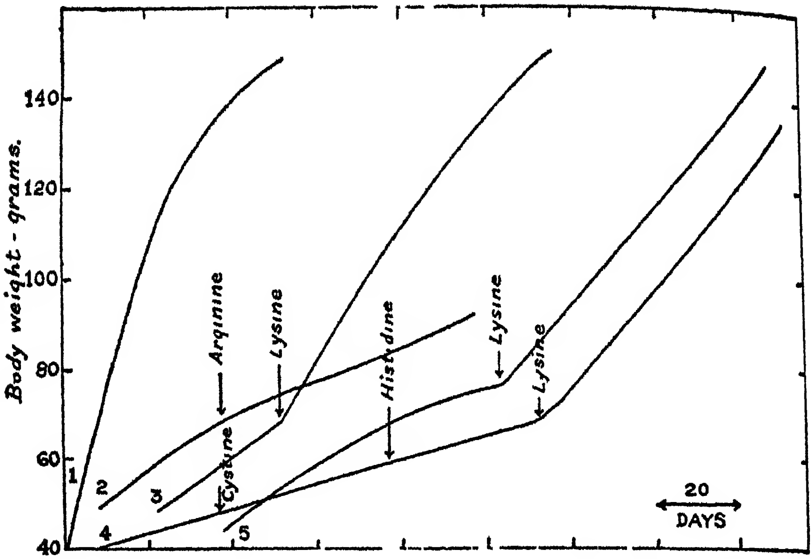

CHART 1—Growth of young rats. Curve 1 shows normal growth on a diet of 30 percent *unheated* milk powder plus 70 percent ground wheat. Curves 2 to 5 show retardation of growth on a diet of 30 percent *heated* milk powder plus 70 percent ground wheat. The arrows indicate that the diet was supplemented with 0.5 percent arginine, 0.1 percent cystine, 0.1 percent histidine or 0.2 percent lysine. The lysine supplement is the only supplement which has a growth stimulating action. The failure of normal growth on the heated milk powder diet is therefore due to a deficiency of the diet in available lysine.

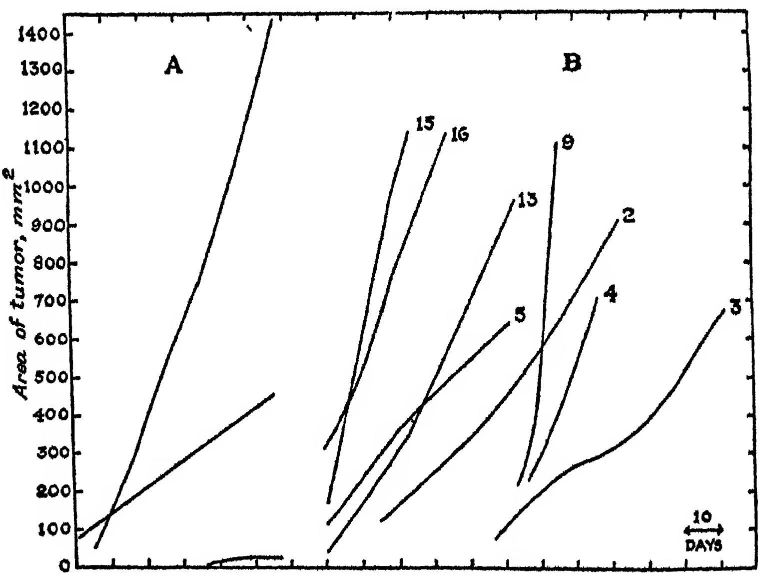

CHART 2—Tumor growth. Curves A show the variation in the growth rate of three multiple tumors in one animal, fed on the diet containing *unheated* milk powder. Curves B show the variation in the growth rate of tumors in different animals fed on the same diet.

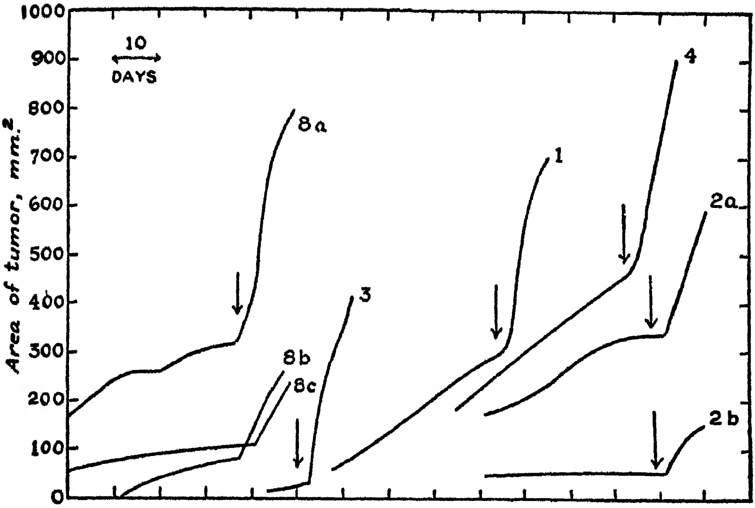

CHART 3.—Tumor growth. The first part of the curves shows the retardation in tumor growth in animals fed on the *heated* milk powder diet. The arrows indicate that the *heated* milk powder in the diet was replaced by *unheated* milk powder. Note the rapid tumor growth following this change.

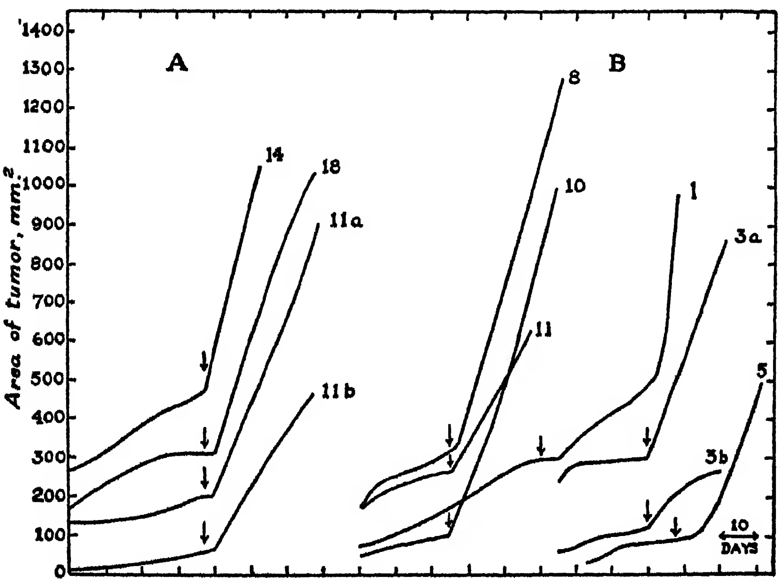

CHART 4.—Tumor growth. The first part of the curves again shows the inhibition of tumor growth in animals fed on the *heated* milk powder diet. Supplementing this diet with lysine, as indicated by the arrows, causes a striking stimulation of tumor growth

then, after this preliminary period heated milk powder is replaced by unheated milk powder, as indicated by the vertical arrows, the growth of the tumors is strikingly accelerated.

Finally, chart 4 includes representative growth rates of 11 tumors out of a series of 15 experiments. The animals were first changed from the stock diet to the heated milk powder diet and kept on this for several weeks, during which period the tumors showed marked inhibition in growth. From the time indicated by the arrows, 0.2 percent lysine was added to the diet. As will be seen, this small amount of lysine caused a prompt and striking acceleration in tumor growth rate.

DISCUSSION

From a chemical viewpoint it is difficult to account for the differences in the growth rates of different tumors, particularly so in the case of multiple tumors, all of which are presumably supplied with blood of the same chemical composition. It is possible that variations in the tumor vascularity are involved.

The nature of the apparent lysine deficiency of the heated milk powder diet calls for some comments. According to Osborne, Van Slyke, Leavenworth, and Vinograd (1915), the mixed proteins of whole wheat (gluten) yield about 1.58 percent of lysine. Since wheat contains a large amount of starch and fiber (approximately 90 percent), and therefore a relatively small percentage of total proteins, it is obvious that the lysine supplied by the wheat component of the heated milk powder diet is relatively low. In the unheated milk powder diet the total lysine content is considerably raised by the lysine furnished by the milk proteins, and it is evident that this diet promotes normal growth and reproduction of mice and rats, as well as rapid growth of the mammary carcinoma.

If, however, the unheated milk powder is replaced in the diet by milk powder heated under the specified conditions, such a diet permits only slow growth in normal rats and greatly reduced tumor growth in mice. The results, furthermore, clearly show that both normal and malignant growth are strikingly accelerated by the lysine supplement.

This suggests that, as a result of heating the milk powder, the lysine of the milk proteins is either destroyed or modified in such manner that it is no longer properly utilized, owing to defective gastrointestinal digestion of the heated milk proteins. The latter explanation seems to have much in its favor as judged in the light of the work of Greaves and Morgan (1934) on the nutritive value of raw and heated casein. These workers showed that the deterioration in the nutritive value of heated casein can be compensated for by the

addition of lysine to the diet. Moreover, Block, Jones, and Gersdorff (1934) found by the modified Kossel-Kutscher isolation procedure that "the proportion of lysine yielded by acid hydrolysis of casein is not materially affected by treatment with dry heat at 150° for 65 minutes." The recent experiments of Seegers and Mattill (1935) indicate that liver proteins subjected to excessive heating also lose part of their biological value for growth, this being due to lowered digestibility, since this defect was corrected by feeding the acid hydrolysates of heated liver supplemented with tryptophane.

Attention is again called to the fact that not all the tumors of animals maintained on the heated milk powder diet showed a striking inhibition in growth. Occasionally a few tumors in a set grew rather rapidly, and these, of course, were not suited for the lysine experiments. Evidently the character of this diet is not defective enough to inhibit all malignant growths. An attempt was made, therefore, to decrease the value of the diet still further by increasing the proportion of the heated milk powder from 30 percent to 40 and to 55 percent, and, in addition, by furnishing the animals with 2 percent cod liver oil as a source of vitamins A and D. From these experiments the conclusion was reached that, whereas the heated milk powder at a level of 30 percent maintains the weight of the animals quite satisfactorily, loss of body weight results with the 40-percent level, though the tumors either fail to grow or show a marked tendency to regression. The animals die prematurely. On the 55-percent heated milk powder level the condition of the animals deteriorated even more rapidly and most of them died in about 10 days from malnutrition and inadequate food consumption, as shown by actual records. In this connection attention is called to the work of Rous (1914), who observed marked retardation of malignant growth in mice with spontaneous mammary carcinoma fed on a very inadequate diet. He interpreted the inhibition of tumor growth under these conditions as being caused by poor appetite and by the great loss in body weight, i. e., extreme malnutrition of a nonspecific nature, which did not permit an adequate elaboration of a vascularizing and supporting tumor stroma. On the basis of present knowledge concerning the physiological nutritional requirements it is obvious that the diet used by Rous was quite inadequate in its supply of vitamins. It is possible that the 40- and 50-percent heated milk powder diets used by us may also have been deficient in vitamins and perhaps also in essential amino acids other than lysine. In all events the 30-percent heated milk powder diet quite by accident furnished a means for the study of the importance of lysine to malignant growth.

CONCLUSIONS

A diet composed essentially of 70 percent ground wheat and 30 percent whole milk powder promotes normal growth in young rats and rapid growth of spontaneous mammary carcinoma in mice.

If the milk powder of this diet has been subjected to heat under the specified conditions, the resulting diet is inadequate for normal growth and malignant growth as a rule is greatly inhibited.

This inhibition of normal and malignant growth is removed by the administration of lysine. An adequate supply of lysine in utilizable form is therefore necessary for the rapid growth of the malignant tumor used in these experiments.

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II. THE EFFECT ON MALIGNANT GROWTH OF A GLIADIN DIET

By Carl Voegtlin, *Medical Director*, and Mary E. Maver, *Biochemist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

In previous work (preceding article, Voegtlin and Thompson, 1936), evidence was secured suggesting that lysine is an essential factor for the rapid proliferation of the Marsh spontaneous mammary mouse carcinoma. Tumor growth was inhibited by feeding the mice on a diet composed essentially of 30 percent *heated* whole milk powder and 70 percent ground whole wheat. This diet is deficient in physiologically available lysine, since the heating of the milk proteins apparently renders the lysine of these proteins unavailable for normal growth of young rats and for rapid growth of tumors in mice. Addition of lysine to the deficient diet was found to accelerate both normal and tumor growth.

In order to obtain further conclusive evidence of the importance of lysine for malignant growth, it was deemed necessary to carry out experiments similar to those of Osborne and Mendel (1914), who discovered the indispensable role of lysine for normal growth. These authors found that young rats could maintain their body weights and grow very slowly on a diet in which wheat gliadin, which contains only a relatively small percentage of lysine, was the sole source of protein. An immediate increase in growth rate occurred when the gliadin diet was supplemented with lysine. Similar results were obtained when zein (supplemented with tryptophane) comprised the only source of dietary protein (Osborne and Mendel, 1914).

The work presented here describes the results of feeding experiments on young mice and adult tumor mice in which the quantity of available lysine was first greatly decreased by feeding gliadin as the sole source of protein, and then increased by the addition of lysine to the basal diet.

Since Osborne and Mendel (1914) had shown, furthermore, that glutenin, the other principal wheat protein besides gliadin, promotes normal growth in rats, it was of interest to carry out work with young mice and adult tumor mice using glutenin as the sole source of dietary protein.

EXPERIMENTAL

Methods.—Gliadin and glutenin were prepared from hard wheat flour using the method of Osborne and Strauss. McCollum's salt mixture No. 185 was used. We were fortunate to have at our disposal a very potent B_1B_2 vitamin concentrate from brewers' yeast which was prepared and submitted to bio-assay by Drs. M. I. Smith and A. Seidell of this Institute (Smith and Seidell, 1936). Their figures show that concentrate 36.93 (which was used by us) is at least 50 times more active, weight for weight, than a potent sample of dried brewers' yeast. Such a small quantity (0.1 percent) of this vitamin concentrate was incorporated in the diet that the possibility of furnishing appreciable lysine from this source was very slight indeed. The 20 percent fat was a hydrogenated cottonseed oil (Crisco). The lysine was the natural optically active form.

The diets had the following composition:

Gliadin diet

Gliadin	18.00
Salt mixture	4.00
B_1B_2	0.10
Starch	54.90
Crisco	20.00
Cod liver oil	3.00

Gliadin diet plus lysine

Gliadin	16.80
Lysine—2HCl	1.20
Salt mixture	4.00
B_1B_2	0.10
Starch	54.32
Crisco	20.00
Cod liver oil	3.00

The glutenin was also fed at the 18 percent level, the diet being otherwise the same except that in some glutenin experiments dried brewers' yeast (4 percent) was substituted for the B_1B_2 concentrate.

The gliadin diet was first fed to young female mice just after weaning and during their normally most rapid period of growth in order to determine whether the diet was sufficient to maintain body weight and permit such growth as was possible with the small quantity of lysine in the gliadin. After a period of 21 days on the gliadin diet, 0.54 or 0.8 percent lysine was incorporated in the diet. The body weight was determined twice weekly along with the food consumption.

For reasons mentioned in the previous paper, mice with spontaneous mammary carcinoma were used. These came partly from our own colony and in part were furnished from the same mouse strain maintained at the New York State Institute for the Study of Malignant Disease. We are greatly indebted to Dr. Simpson and Mr. Marsh for this help. Animals having relatively small tumors were chosen. The tumor area was estimated by multiplying the two greatest dimensions of the tumor. These measurements, as well as the body weights, were taken twice a week. A record was regularly kept of the food consumption. The experiments were discontinued when the tumors ulcerated. At the end of the experiments an autopsy was done. The tumors were submitted for histological confirmation of the diagnosis to Passed Assistant Surgeon Ashburn, whose assistance we gratefully acknowledge. The tumors included in this report were all mammary carcinomas.

Young mice on gliadin diet.—After 10 young female mice, weighing from 7 to 9 grams, had grown rapidly on our laboratory stock diet[1] for a few days, the change to the gliadin diet for 20 days caused an abrupt retardation of growth (chart 1, A). The initial drop in weight is probably due to very low food consumption on the first and second days of the new diet as shown by records for that time interval. Compared with the norwal growth curve for young female mice which we have taken from Thompson and Mendel (1917 18), the increase in body weight shown by some of the mice on the gliadin diet is very slight and is probably afforded by the small quantity of lysine in the gliadin. The addition of 0.54 percent lysine to the diet caused an immediate marked increase in body weight in the majority of the animals. Later on in this experiment the lysine of the diet was increased to 0.8 percent without causing a further increase in growth rate. That the increase in growth rate, following the addition of lysine to the diet, is not due to an increased food consumption on the lysine-sufficient diet is clearly indicated in table 1, which shows

[1] Whole milk powder 30 percent, ground wheat 70 percent, plus 2 percent NaCl of the weight of wheat used.

that the average daily food consumption was practically the same before and after lysine was added to the gliadin diet.

TABLE 1.—*Average daily food consumption of the young mice whose growth curves are shown in chart 1 A and B*

No of mouse	On gliadin diet	With added lysine
1	1.48	1.64
4	2.17	1.69
5	2.01	1.92
6	2.22	2.09
13	1.86	1.63
	Glutenin diet	
66	2.70	----------
67	3.38	----------
68	3.12	----------
70	2.96	----------
71	2.32	----------

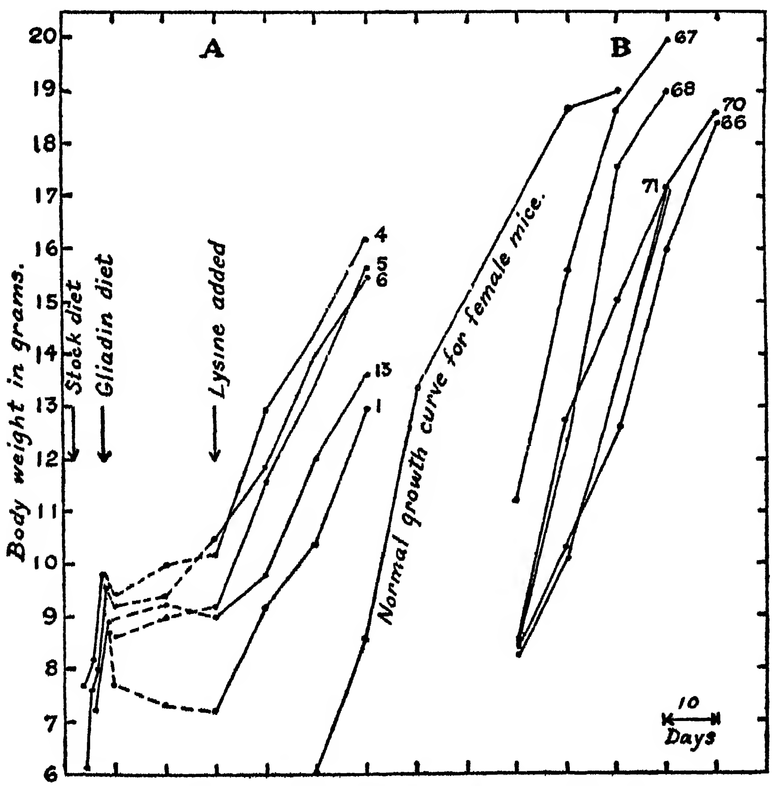

CHART 1.—Growth of young female mice. (A) The broken lines illustrate the stunting effect of the gliadin diet to which the addition of lysine permits normal growth. (B) These mice were fed a diet in which glutenin replaced the gliadin as the sole source of protein.

Young mice on glutenin diet. Eight young female mice fed on a diet in which the glutenin of wheat replaced the gliadin showed practically normal growth. Brewer's yeast (4 percent) was also substituted for the B_1B_2 concentrate in this diet, because of the limited supply of this concentrate. Some of these growth curves are shown in chart 1, B.

TABLE 2. *Average weights and the average daily food consumption calculated for 25 grams of body weight of the mice whose tumor areas are plotted in chart 2 A, B, and C*

No. of mouse	On gliadin diet		On gliadin diet + lysine		Second period on gliadin diet	
	Average weight	Average food consumption	Average weight	Average food consumption	Average weight	Average food consumption
	Grams	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
A21	30.1	2.87	28.2	3.12		--------
22	26.6	3.47	26.7	2.72		--------
24	25.6	2.70	24.3	3.27		--------
25	30.0	3.1	25.9	3.27		--------
29	28.3	2.95	27.0	2.72		--------
B32	24.7	2.80	22.1	3.17		--------
34	24.5	2.62	22.5	3.45		--------
35	27.5	2.90	25.0	3.46		--------
38	27.2	3.0	25.8	3.33		--------
43	23.5	2.87	22.0	2.75		--------
44	25.5	2.80	26.2	3.07		--------
47	26.6	3.27	25.0	2.27		--------
48	25.8	2.60	27.0	2.75		--------
49	23.0	3.47	21.6	4.0		--------
C36	31.0	2.5	31.0	2.78	31.0	2.15
39	27.2	2.55	29.0	2.90	28.2	2.55
42	26.0	2.47	25.0	2.42	21.6	2.45
45	29.8	3.25	29.3	2.5	27.4	2.52
51	28.4	3.90	26.3	2.97	23.2	3.90
52	25.4	3.42	27.6	2.56	26.8	2.77

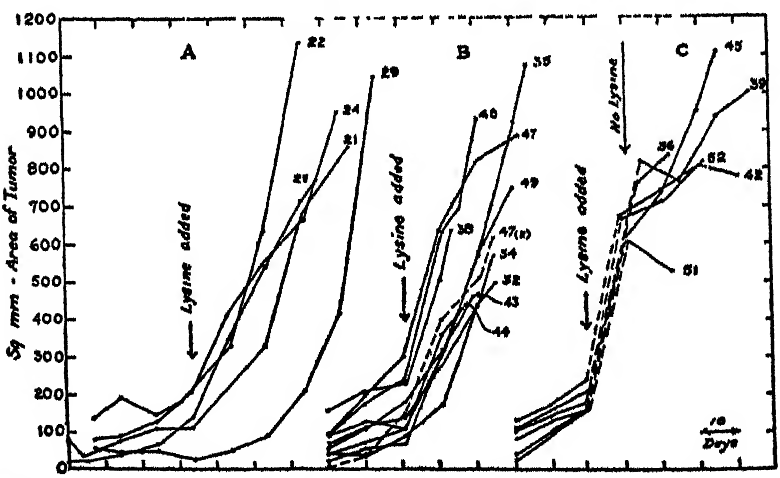

CHART 2.—Tumor growth. These curves all illustrate the tumor growth retardation on a gliadin diet and the resumption of growth when lysine was added. It will be noted that the growth-stimulating action of the lysine supplement manifests itself more rapidly if the period of lysine deficiency is short (compare curves A with curves B). (C) These curves illustrate the inhibiting effect of the withdrawal of added lysine from the gliadin diet after a short period of rapid tumor growth with lysine added.

The effect of a lysine deficient diet on tumor growth.—The tumors of the mice fed on the gliadin diet for a period of 27 to 34 days were definitely inhibited in growth (chart 2, A). When 0.8 percent lysine was added to the gliadin diet there was a definite increase in the rate of growth of these tumors. The tumors of the mice fed for a shorter period of 21 days on the gliadin diet before the addition of lysine exhibited a more rapid response in the tumor growth rate (chart 2, B). The inhibiting effect of the subsequent withdrawal of lysine after a short period of rapid tumor growth is shown in chart 2, C. The broken lines indicate the periods during which lysine was added to the gliadin diet. From the data presented in table 2 it appears that the increased rate of tumor growth during the period when the diet was supplemented with lysine cannot be attributed to an increased consumption of food. It is also apparent that the average total body weight (inclusive of tumor) does not reveal any significant differences between the gliadin diet and gliadin + lysine diet periods.

The rate of tumor growth on glutenin diets.—Two sets of animals were fed a diet corresponding to the gliadin diet in which glutenin replaced the gliadin as the source of protein. The vitamin B_1B_2 complex in the form of dried browers' yeast was fed to one set (chart 3, B) and the B_1B_2 concentrate was fed to the other (chart 3, A). It is evident that all the tumors showed rapid growth, such as is obtained by feeding our stock diet of whole milk powder and wheat. Comparison of the average daily food consumption of the animals on the glutenin diet (table 3) with the corresponding data of the animals maintained on the gliadin diet (table 2) indicates no significant difference in the two sets of data. This is further proof that the inhibition of tumor growth on the gliadin diet is due to lysine deficiency.

TABLE 3.—*Average weights and the average food consumption calculated for 25 grams of body weight of the mice whose tumor areas are plotted in chart 3 A and B*

Glutenin diet with B_1B_2 concentrate			Glutenin diet with brewers' yeast		
No. of mouse	Average body weight	Average food consumption	No. of mouse	Average body weight	Average food consumption
	Gram	*Gram*		*Gram*	*Gram*
72	24.6	3.12	53	25.0	2.76
74	29.3	2.85	54	28.0	2.95
75	27.6	3.00	55	28.6	3.22
76	26.2	2.05	57	28.6	2.77
77	25.5	2.49	59	32.0	3.25
			61	27.0	3.07

DISCUSSION OF RESULTS

The effect of feeding a gliadin diet, which is deficient in lysine, to young growing mice and to adult tumor mice is a marked stunting of the young mice and a striking inhibition of the growth of the tumors in adult mice. That this inhibition of normal as well as malignant tissue growth is due to a deficiency of the diet in a

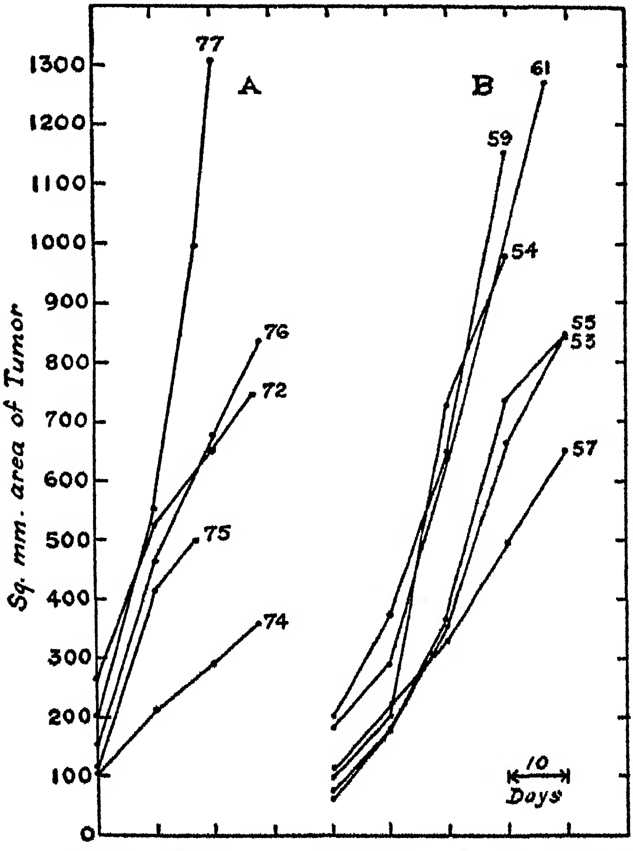

CHART 3.—Tumor growth. These mice were fed a diet in which wheat glutenin replaced the gliadin as the only protein, with a potent B_1B_2 concentrate (curves A) and brewers' yeast (curves B) as the source of the B_1B_2 vitamin complex. Note the rapid tumor growth on these diets which are adequate with respect to lysine.

specific amino acid is proved by the marked increase in the growth rate of the normal tissues in young mice and of the malignant tissues in the adult mice when the deficient lysine is added to the diet in relatively small amounts. The inhibiting effect of the subsequent withdrawal of lysine from the diet is further substantiation of the importance of lysine for malignant growth. The food-consumption studies clearly show that this specific growth-stimulating effect

of lysine cannot be attributed to an increased food consumption during the period when the animals received the lysine-sufficient diet.

The results of the experiments with young mice are in agreement with the earlier work of Osborne and Mendel (1914) on the essential nature of lysine for normal growth in rats, which was done at a time when the requirements of the different vitamins for growth were not as clearly defined as at present.

It should be mentioned that Drummond (1917) has made an effort to study the effect of a gliadin diet on the growth of a transplanted round celled sarcoma in five rats, using however a totally different procedure from ours. Drummond emphasized the greater desirability of using spontaneous instead of the objectionable transplanted tumors, which latter, as a rule, are subject to many uncontrollable factors influencing their growth and spontaneous regression. He apparently was unable to secure spontaneous tumors, and his results were inconclusive. More recently, Courrier and Coste (1934) have found that the growth of the transplanted Jensen sarcoma was decidedly inhibited in rats fed on a diet in which gliadin furnished the major portion of the amino acid supply. However, these workers failed to establish that the inhibition of tumor growth was due to a specific lysine deficiency by obtaining a growth response on the addition of this factor to the diet, nor did they record the food consumption of their animals. Since the animals were placed on the deficient diet for some time previous to inoculation of the tumor tissue, the alleged inhibition of tumor growth may in reality have been due to an unfavorable influence of the diet on the formation of the tumor stroma for establishing the transplants (see Rous, 1914).

On the basis of clinical observation and experimentation on animals it is generally believed that neoplastic tissues can proliferate vigorously in spite of unfavorable dietary and metabolic conditions. The main result of the present work clearly shows that this conception must be modified, since it was possible to cause a marked inhibition in the growth rate of a typical neoplasm by a diet deficient in lysine. How is this inhibition of tumor growth to be explained? It is safe to assume that there is a continuous demand for lysine for the construction of cell proteins for purposes of malignant as well as normal tissue growth. The young mouse and the tumor tissue cannot synthesize lysine, and therefore lysine must be supplied in adequate amounts with the diet. There is little doubt that the speeding up of tumor growth following the administration of the lysine supplement is due to lysine being carried by the blood to the tumor and being utilized there for the synthesis of tumor proteins. In this respect tumor tissue does not differ from the tissues of a young animal.

However, there is another possible source of lysine for tumor growth namely, the lysine liberated by the degradation of the normal tissues which are invaded by the tumor and the lysine which may be liberated from dying malignant cells in the necrotic portion of tumors. What part this internal source of lysine plays in tumor growth as compared with the lysine furnished with the diet is difficult to estimate on the basis of the experimental evidence. All that can be said is that on the lysine deficient diet the body weight was maintained practically unchanged and the tumors showed a much inhibited growth or practically no growth. Following the administration of the lysine supplement the tumor growth rate was greatly increased, showing that under the prevailing conditions the external supply of lysine played a predominant role. During this period of rapid tumor growth the total body weight (inclusive of the tumor weight) had a tendency to decrease as compared with the average body weight on the deficient diet (see table 2). This apparent loss of weight of tissues other than those of the tumor is very likely due to a pathological alteration of the systemic metabolism resulting from tumor necrosis and cachexia. A similar situation was met with in other work with tumor animals maintained on an adequate diet and in the presence of relatively large and partially necrotic tumors.

CONCLUSIONS

Normal growth of young mice and the growth of a spontaneous mammary carcinoma of adult mice are inhibited by a diet containing gliadin as the source of protein.

The addition of lysine renders this diet adequate for both normal and malignant growth.

Similar experiments with a diet in which glutenin takes the place of gliadin indicate that normal and malignant growth are not inhibited.

Since gliadin is known to be deficient in the indispensable normal growth factor lysine, whereas glutenin is a complete protein, the conclusion is reached that lysine is an essential factor necessary for the growth of the mammary carcinoma.

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TYPHOID FEVER OUTBREAK TRACED TO POLLUTED SPRING WATER

Between July 1 and September 7, 1936, about 60 cases of typhoid fever were reported from Bergen County, N. J., and 40 of these cases have been traced to a spring in Englewood.

Investigation showed that the spring water was used by persons passing by, who stopped for a drink or took home bottles of the water. The "spring" was actually a stone reservoir fed by a pipe and having an overflow spout. The water had evidently been polluted by human feces deposited nearby, the contiguous area being covered by a growth of bushes. Numerous rodent holes permitted the surface water from heavy rains to wash this pollution down to an open-jointed tile pipe that carried water from a hidden spring to the reservoir.

The reservoir was drained on August 18 and has been inaccessible to the public since that date. The last case of typhoid, so far as is known, showed first symptoms on September 7. As persons who acquired the infection through this source would have developed the disease by the latter date, the source of the outbreak has no doubt been eliminated.

PLAGUE INFECTION IN FLEAS TAKEN FROM GROUND SQUIRRELS IN SAN BERNARDINO COUNTY, CALIF.

A communication dated September 26, 1936, received from Senior Surg. C. R. Eskey, in charge of the United States Public Health Service plague laboratory in San Francisco, transmitted a report from Dr. K. F. Meyer, of the Hooper Foundation for Medical Research, stating that plague-infected fleas had been found in San Bernardino County, Calif. Fleas collected from ground squirrels (*Citellus beechyi fisheri* Merriam) during the period August 18–21 were inoculated into a guinea pig and the animal showed typical plague infection on the fifth day.

In 1933 a human case of plague was suspected to have had its origin in San Bernardino County, and during the present year another person was found to have positive plague agglutination of his blood after a mild illness that occurred while camping in this county. Efforts were made to find plague-infected rodents in San Bernardino County in 1933 and again this year, but thus far the infection has not been discovered in animal tissue.

ACCURACY OF HEART DISEASE MORTALITY STATISTICS

During the past 20 years there has been an increased tendency to diagnose heart disease from the standpoint of etiology. At the present time nearly all standard textbooks, articles appearing in

medical journals, and systems of nomenclature are written on this basis. This attitude reflects progress from the viewpoint of prevention, as it is evident that the term "heart disease" embraces a number of factors each of which is a problem in itself.

A report on a study of the accuracy of recording heart disease mortality in Washington, D. C., has recently been published by the Public Health Service.[1] The bulletin includes a comparison of modern clinical concepts of heart disease with the official method of recording heart-disease mortality, a discussion of the current practices in reporting deaths due to heart disease, an analysis of deaths due to heart disease occurring in Washington (D. C.) hospitals during 1932, and suggestions for improvement. A number of tables are included showing the difference in the basis of officially recording heart disease mortality as compared with present-day terminology, types of diagnoses appearing on death certificates, the accuracy of the reports, and a proposed plan based on etiology for reporting and recording heart disease mortality.

Included among the findings were the following:

1. Of 450 deaths from heart disease occurring in hospitals, only 62 percent were so recorded for purposes of vital statistics. On the other hand, only 80 percent of 350 deaths in hospitals officially recorded as heart disease appeared, on review of the hospital records, to be due to that cause.

2. It is extremely difficult to tabulate satisfactorily diagnoses made on the basis of etiology in terms of the International List of Causes of Death. Quite often when a death is certified on the basis of etiology it ceases to be heart disease for purposes of vital statistics.

3. The International List of Causes of Death should be revised to permit a better tabulation of heart disease deaths certified on the basis of etiology. In lieu of this, a plan is offered whereby heart-disease mortality may be computed from an etiologic point of view and still conform to the existing system.

DEATHS DURING WEEK ENDED SEPTEMBER 26, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 26, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,309	7,142
Deaths per 1,000 population, annual basis	10.2	10.0
Deaths under 1 year of age	551	504
Deaths under 1 year of age per 1,000 estimated live births	50	46
Deaths per 1,000 population, annual basis, first 39 weeks of year	12.2	11.4
Data from industrial insurance companies:		
Policies in force	68,501,572	67,028,155
Number of death claims	11,065	11,138
Death claims per 1,000 policies in force, annual rate	8.4	8.6
Death claims per 1,000 policies, first 39 weeks of year, annual rate	10.0	9.7

[1] Studies of Heart Disease Mortality. By O. F. Hedley. Pub. Health Bull. No. 231. Government Printing Office, Washington, 1936.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Oct. 3, 1936, and Oct. 5, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 3, 1936, and Oct. 5, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935
New England States:								
Maine		8		5	7	20	0	1
New Hampshire		1			17		0	0
Vermont		1			8	10	0	0
Massachusetts	5	4			37	27	0	4
Rhode Island		2					1	1
Connecticut		5	2	1	4	31	1	0
Middle Atlantic States:								
New York	11	38	[1] 8	[1] 7	42	89	4	6
New Jersey	6	14	7	4	8	10	3	1
Pennsylvania	16	52			23	49	4	2
East North Central States:								
Ohio	34	96	1	17	11	32	7	0
Indiana	17	76	27	13	4	15	0	1
Illinois [2]	18	47	11	18	11	12	5	1
Michigan	9	23	1	1	5	27	4	1
Wisconsin	5	7	17	6	12	43	2	1
West North Central States:								
Minnesota	2	11			5	5	0	1
Iowa	8	13		10	1	2	0	0
Missouri	6	55	28	37		18	2	5
North Dakota	2	6				8	0	0
South Dakota	1	4			2	1	0	0
Nebraska		3			1		0	0
Kansas	6	20	1	1	2	4	0	1
South Atlantic States:								
Delaware		1			2	83	0	0
Maryland [3]	21	9	8	4	4	2	4	2
District of Columbia	11	15					5	2
Virginia	25	62				9	0	2
West Virginia	19	71	5	22		5	2	0
North Carolina [3] [4]	112	64	1	7	2	1	4	1
South Carolina [4]	16	20	79	171			1	0
Georgia [4]	40	32					0	0
Florida [4]	7	8		1		5	0	0
East South Central States:								
Kentucky	32	60		5	3	13	3	2
Tennessee	50	67	10			1	2	3
Alabama [4]	85	45	2	5	1		0	0
Mississippi [4]	23	23					0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 3, 1936, and Oct. 5, 1935 - Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct 3, 1936	Week ended Oct 5, 1935	Week ended Oct 3, 1936	Week ended Oct 5, 1935	Week ended Oct 3, 1936	Week ended Oct 5, 1935	Week ended Oct 3, 1936	Week ended Oct 5, 1935
West South Central States								
Arkansas	10	20	---	7	-	---	0	1
Louisiana [4]	18	26	5	6	3	2	1	0
Oklahoma [5]	10	21	20	37	1	-	2	3
Texas [4]	31	76	28	61	4	16	0	1
Mountain States:								
Montana	---	---	--	5	2	14	0	0
Idaho	---	1	6	-	---		0	0
Wyoming	---	3	---	---	---	11	0	0
Colorado	6	6	---	---	3	10	1	1
New Mexico	6	0	2	1	9	1	0	1
Arizona	3	1	16	17	3	3	0	0
Utah [3]	---	---	---	---	1		0	0
Pacific States:								
Washington	3	3	---	---	4	34	0	0
Oregon	4	2	14	19	3	48	0	2
California	36	40	27	18	30	71	0	2
Total	664	1,177	327	506	270	652	58	40
First 40 weeks of year	18,437	23,599	143,529	106,981	272,491	699,648	6,360	4,594

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 3, 1936	Week ended Oct 5, 1935	Week ended Oct 3, 1936	Week ended Oct 5, 1935	Week ended Oct 3, 1936	Week ended Oct 5, 1935	Week ended Oct 3, 1936	Week ended Oct 5, 1935
New England States:								
Maine	0	7	11	13	0	0	1	7
New Hampshire	0	3	5	---	0	0	0	0
Vermont	0	3	5	5	0	0	0	0
Massachusetts	1	99	57	90	0	0	2	3
Rhode Island	0	25	12	4	0	0	0	0
Connecticut	0	22	8	27	0	0	2	2
Middle Atlantic States:								
New York	6	106	149	213	0	0	21	20
New Jersey	1	31	16	37	0	0	10	12
Pennsylvania	11	12	142	211	0	0	32	20
East North Central States:								
Ohio	40	8	118	244	2	2	41	46
Indiana	3	1	38	97	1	1	11	3
Illinois [2]	70	23	122	247	7	1	32	27
Michigan	15	25	114	117	0	1	5	17
Wisconsin	6	2	102	151	1	1	1	8
West North Central States:								
Minnesota	8	4	27	93	0	0	0	0
Iowa	9	3	33	42	3	2	12	5
Missouri	0	2	14	55	1	2	16	11
North Dakota	2	1	17	12	2	1	8	0
South Dakota	2	0	14	22	0	0	1	4
Nebraska	2	1	12	26	0	3	1	0
Kansas	10	0	27	65	0	9	3	12
South Atlantic States:								
Delaware	0	0	4	3	0	0	2	2
Maryland [3]	1	4	29	45	0	0	10	32
District of Columbia	3	5	8	6	4	0	0	2
Virginia	3	7	17	58	0	0	15	25
West Virginia	7	1	46	78	0	0	15	16
North Carolina [3 4]	0	9	57	57	0	0	22	16
South Carolina [4]	0	1	4	7	0	0	16	7
Georgia [4]	8	0	13	22	0	0	86	13
Florida [4]	9	0	4	3	0	0	0	6
East South Central States:								
Kentucky	3	11	31	75	0	0	19	148
Tennessee	24	1	45	69	1	0	87	24
Alabama [4]	6	0	17	10	0	0	12	[illegible]
Mississippi [4]	4	0	7	15	0	1	2	11

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 3, 1936, and Oct. 5, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935	Week ended Oct. 3, 1936	Week ended Oct. 5, 1935
West South Central States:								
Arkansas	0	0	2	7	0	0	5	9
Louisiana [4]	1	0	2	15	0	0	17	7
Oklahoma [5]	2	0	8	19	0	1	7	17
Texas [4]	1	1	82	23	0	0	30	27
Mountain States:								
Montana	1	0	46	52	7	0	3	3
Idaho	0	0	83	2	2	1	1	1
Wyoming	2	0	3	15	3	1	2	0
Colorado	8	0	16	35	0	0	4	4
New Mexico	1	0	6	10	0	0	14	22
Arizona	0	0	5	9	0	0	2	2
Utah [3]	1	0	10	27	8	0	0	2
Pacific States:								
Washington	4	2	83	43	0	5	2	1
Oregon	2	1	23	48	0	0	7	3
California	18	20	120	140	0	1	9	29
Total	290	445	1,664	2,664	37	33	484	623
First 40 weeks of year	2,849	8,952	191,680	191,698	6,290	5,517	10,925	14,074

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Oct. 3, 1936, 2 cases as follows: Illinois, 1; North Carolina, 1.
[3] Week ended earlier than Saturday.
[4] Typhus fever cases, week ended Oct. 3, 1936, 58 cases, as follows: North Carolina, 4; South Carolina, 3; Georgia, 20; Florida, 2; Alabama, 12; Mississippi, 1; Louisiana, 1; Texas, 15.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September 1936										
Arkansas	1	37	8	313		12	3	17	0	54
Delaware				5	7		0	6	0	6
Nebraska		18			6		7	27	1	3

September 1936

	Cases
Chicken pox:	
Arkansas	18
Delaware	1
Nebraska	6
Dysentery:	
Delaware	1
Mumps:	
Arkansas	15
Nebraska	9
Ophthalmia neonatorum:	
Delaware	1
Paratyphoid fever:	
Delaware	3
Rocky Mountain spotted fever:	
Delaware	1
Septic sore throat:	
Nebraska	1
Trachoma:	
Arkansas	2
Undulant fever:	
Arkansas	5
Whooping cough:	
Arkansas	10
Delaware	45
Nebraska	22

PLAGUE INFECTION IN SAN BERNARDINO COUNTY, CALIF.

Plague infection has been found in fleas taken August 18 to 21, 1936, from ground squirrels in San Bernardino County, Calif. (See fuller report on p. 1445.)

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 26, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	1	0	0	1	1	6	21
New Hampshire:											
Concord	------	------	------	------	------	------	------	------	------	------	------
Manchester	0	------	0	0	1	0	0	1	0	0	17
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	3	6
Rutland	0	------	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	1	------	0	5	11	16	0	7	1	61	194
Fall River	0	------	0	0	3	0	0	1	0	0	30
Springfield	0	------	0	0	1	1	0	1	0	7	22
Worcester	2	------	0	1	3	4	0	0	0	10	45
Rhode Island:											
Pawtucket	------	------	------	------	------	------	------	------	------	------	------
Providence	0	------	0	5	4	8	0	0	0	8	55
Connecticut:											
Bridgeport	0	------	0	2	1	1	0	0	0	9	35
Hartford	0	------	0	0	1	7	0	1	0	4	36
New Haven	0	------	0	0	1	0	0	0	1	5	22
New York:											
Buffalo	0	------	1	2	8	7	0	9	0	6	130
New York	6	11	8	17	59	34	0	67	18	101	1,235
Rochester	0	------	0	0	1	0	0	2	0	4	52
Syracuse	0	------	0	0	0	1	0	2	0	19	32
New Jersey:											
Camden	0	------	0	1	2	0	0	1	1	1	23
Newark	0	1	0	1	6	1	0	1	0	23	66
Trenton	0	------	1	0	2	3	0	1	1	1	37
Pennsylvania:											
Philadelphia	1	------	3	2	13	15	0	19	4	97	374
Pittsburgh	7	1	0	0	22	12	0	6	1	14	158
Reading	0	------	0	0	0	0	0	0	0	12	21
Scranton	0	------	------	0	------	1	0	------	1	0	------
Ohio:											
Cincinnati	2	------	0	0	4	6	0	5	3	3	118
Cleveland	1	------	0	1	5	16	0	14	1	48	178
Columbus	0	------	0	0	2	3	0	5	6	6	103
Toledo	0	1	1	2	2	3	0	5	0	17	72
Indiana:											
Anderson	0	------	0	0	2	4	0	0	0	2	7
Fort Wayne	0	------	0	0	1	0	0	0	0	1	20
Indianapolis	0	------	0	0	2	12	0	3	0	1	105
Muncie	0	------	0	0	4	0	0	2	0	0	10
South Bend	0	------	0	0	1	0	0	0	0	0	8
Terre Haute	0	------	0	0	0	1	0	0	0	0	11
Illinois:											
Alton	1	------	0	1	1	1	0	0	0	0	5
Chicago	7	3	1	6	24	40	0	39	8	75	577
Elgin	0	------	0	0	1	1	0	0	0	1	14
Moline	0	------	0	0	0	1	0	0	0	2	6
Springfield	1	------	0	0	3	2	0	0	1	4	26
Michigan:											
Detroit	6	1	0	6	8	30	0	23	1	87	268
Flint	------	------	------	------	------	------	------	------	------	------	------
Grand Rapids	0	------	0	0	1	6	0	0	0	8	30
Wisconsin:											
Kenosha	0	------	0	0	0	4	0	0	0	1	3
Madison	0	------	0	1	0	2	0	0	0	13	14
Milwaukee	0	------	0	3	0	14	0	2	0	44	69
Racine	0	------	0	1	1	5	0	0	0	0	9
Superior	0	------	0	0	0	1	0	1	0	4	5
Minnesota:											
Duluth	0	------	0	1	0	2	0	1	0	3	25
Minneapolis	1	------	3	3	3	5	0	1	0	22	79
St. Paul	0	------	0	5	3	2	0	4	0	31	57

City reports for week ended Sept. 26, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0	--	--	0	--	0	0	--	1	0	--
Davenport	0	--	--	0	--	0	0	--	0	0	--
Des Moines	0	--	--	0	--	2	0	--	0	0	40
Sioux City	0	--	--	0	--	7	2	--	0	4	--
Waterloo	0	--	--	0	--	3	0	--	0	2	--
Missouri:											
Kansas City	0	--	0	0	0	4	0	5	0	3	73
St. Joseph	--	--	--	--	--	--	--	--	--	--	--
St Louis	4	--	0	0	1	11	0	6	5	6	188
North Dakota:											
Fargo	0	--	0	0	0	1	0	0	0	0	4
Grand Forks	0	--	--	0	--	0	0	--	0	0	--
Minot	0	--	0	0	0	0	0	0	2	0	9
South Dakota:											
Aberdeen	1	--	--	0	--	2	0	--	0	0	--
Sioux Falls	0	--	0	0	0	0	0	0	0	0	13
Nebraska:											
Omaha	2	--	0	0	2	2	0	2	0	0	39
Kansas:											
Lawrence	0	--	0	0	1	0	0	0	1	0	5
Topeka	0	--	0	0	2	4	0	0	0	0	23
Wichita	0	--	0	0	3	2	0	1	0	1	29
Delaware:											
Wilmington	0	--	0	0	0	0	0	1	0	0	13
Maryland:											
Baltimore	2	2	2	3	8	6	0	9	3	97	186
Cumberland	0	--	0	0	0	1	0	0	0	0	10
Frederick	0	--	0	0	0	0	0	0	0	0	4
District of Col.:											
Washington	14	--	0	4	4	9	0	10	2	23	140
Virginia:											
Lynchburg	1	--	0	0	0	0	0	2	1	3	10
Norfolk	0	--	0	0	1	1	0	1	1	0	26
Richmond	2	--	0	0	6	3	0	2	0	9	54
Roanoke	1	--	0	0	0	0	0	1	0	0	19
West Virginia:											
Charleston	3	--	0	0	2	0	0	0	1	0	35
Huntington	1	--	--	0	--	3	0	--	0	0	--
Wheeling	0	--	0	0	1	2	0	0	0	0	11
North Carolina:											
Gastonia	0	--	--	0	--	1	0	--	0	0	--
Raleigh	--	--	--	--	--	--	--	--	--	--	--
Wilmington	1	--	0	0	0	0	0	0	0	0	10
Winston-Salem	0	--	0	0	0	1	0	3	0	2	14
South Carolina:											
Charleston	0	2	0	0	1	0	0	0	0	2	28
Columbia	--	--	--	--	--	--	--	--	--	--	--
Florence	0	--	0	0	1	0	0	0	0	0	7
Greenville	1	--	0	0	0	1	0	0	1	0	8
Georgia:											
Atlanta	4	1	1	0	6	3	0	5	0	0	74
Brunswick	0	--	0	0	0	0	0	0	0	0	3
Savannah	2	1	0	0	1	0	0	1	3	0	26
Florida:											
Miami	2	--	1	0	2	0	0	2	0	0	25
Tampa	2	--	0	0	1	0	0	1	0	0	17
Kentucky:											
Ashland	2	--	--	0	--	0	0	--	0	0	--
Covington	0	--	0	0	0	0	0	0	0	0	10
Lexington	0	--	0	2	0	0	0	1	3	1	24
Louisville	1	--	0	1	3	4	0	5	2	19	63
Tennessee:											
Knoxville	3	--	0	0	2	3	0	1	2	0	26
Memphis	3	--	1	0	4	2	0	2	1	7	64
Nashville	0	--	0	0	2	0	0	3	3	0	42
Alabama:											
Birmingham	0	--	0	0	4	1	0	8	2	0	72
Mobile	3	--	0	0	1	0	0	1	0	0	23
Montgomery	4	--	--	0	--	0	0	--	0	8	--
Arkansas:											
Fort Smith	2	--	--	0	--	0	0	--	0	0	--
Little Rock	0	--	0	0	2	0	0	2	0	0	6
Louisiana:											
Lake Charles	0	--	0	0	0	0	0	0	0	0	6
New Orleans	10	1	1	1	13	0	0	16	0	1	172
Shreveport	0	--	0	0	2	0	0	0	2	0	19

City reports for week ended Sept. 26, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oklahoma:											
Oklahoma City	0	6	------	0	3	0	0	2	0	0	37
Texas:											
Dallas	2	------	0	1	3	3	0	4	1	1	48
Fort Worth	0	------	0	0	2	3	0	0	0	0	18
Galveston	0	------	0	0	3	1	0	1	0	0	18
Houston	3	------	0	0	5	1	0	8	1	1	65
San Antonio	1	------	0	0	6	6	0	5	0	0	53
Montana:											
Billings	0	------	0	0	0	1	0	0	0	0	9
Great Falls	0	------	0	0	0	0	0	0	0	0	11
Helena	0	------	0	0	0	0	0	0	0	0	3
Missoula	0	------	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	------	0	0	1	2	0	0	0	0	6
Colorado:											
Colorado Springs	0	------	0	1	0	7	0	1	0	2	9
Denver	3	------	0	2	2	8	0	4	1	34	85
Pueblo	0	------	0	0	1	2	0	0	0	0	11
New Mexico:											
Albuquerque	0	------	0	1	1	4	0	3	1	3	20
Utah:											
Salt Lake City	0	------	0	1	3	2	0	1	0	3	31
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	2	------	0	8	0	1	0	2	2	5	74
Spokane	0	------	0	1	0	5	2	0	0	3	29
Tacoma	0	------	0	0	4	2	1	2	0	0	29
Oregon:											
Portland	1	------	0	0	1	6	0	1	0	1	72
Salem	0	2	------	0	------	0	0	------	0	1	------
California:											
Los Angeles	7	18	1	3	10	12	0	16	2	42	296
Sacramento	5	1	0	0	3	15	0	1	0	9	25
San Francisco	3	------	1	2	8	16	0	6	0	16	169

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:			
Worcester	1	0	0
Connecticut:			
Hartford	0	0	1
New York:			
Buffalo	0	1	8
New York	3	3	8
Rochester	0	0	3
Syracuse	0	0	1
Pennsylvania:			
Philadelphia	0	1	2
Ohio:			
Cincinnati	0	0	1
Cleveland	0	0	3
Columbus	0	0	2
Toledo	1	0	12
Indiana:			
Indianapolis	0	0	2
Illinois:			
Chicago	2	2	30
Michigan:			
Detroit	2	1	5
Minnesota:			
Minneapolis	1	0	1
Iowa:			
Davenport	0	0	1
Des Moines	0	0	2

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Missouri:			
St. Louis	0	0	1
Kansas:			
Wichita	0	0	2
Maryland:			
Baltimore	2	0	1
District of Columbia:			
Washington	0	0	1
Virginia:			
Lynchburg	0	0	2
West Virginia:			
Wheeling	0	0	1
Florida:			
Miami	1	0	0
Kentucky:			
Louisville	1	0	0
Tennessee:			
Memphis	0	0	5
Nashville	0	0	3
Alabama:			
Mobile	0	0	1
Colorado:			
Denver	0	0	2
Oregon:			
Portland	0	1	1
California:			
Los Angeles	1	0	2

Dengue.—Cases: Miami, 2.
Epidemic encephalitis.—Cases: Newark, 1; Pittsburgh, 1.
Pellagra.—Cases: Charleston, S. C., 2; Savannah, 1; Memphis, 1; Los Angeles, 3; San Francisco, 2.

FOREIGN AND INSULAR

CANADA

Manitoba—Poliomyelitis.—During the week ended October 3, 1936, 63 new cases of poliomyelitis were reported in the Province of Manitoba, Canada, making a total of 289 cases reported in the province since the beginning of the outbreak. Five cases were reported in Winnipeg during the week ended October 3.

Provinces—Communicable diseases—2 weeks ended September 19, 1936.—During the 2 weeks ended September 19, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	1	1		1			4
Chicken pox		1		52	112	13	18	10	30	236
Diphtheria	1	10	9	32	16	6	6			80
Dysentery				4	19					23
Erysipelas				7	5	7		3	5	27
Influenza		4			34	3			1	42
Lethargic encephalitis					1					1
Measles		5	5	99	206	11	63	28	31	448
Mumps			1		128	13	8	6	11	167
Paratyphoid fever					10					10
Pneumonia					14				3	17
Poliomyelitis				24	26	66	6	3		125
Scarlet fever	4	8	10	101	141	68	29	47	21	429
Trachoma									4	4
Tuberculosis	8	13	7	113	84	22	2	1	25	275
Typhoid fever	1		2	45	29	5	12	10		104
Undulant fever				1	9		1		1	12
Whooping cough		7	6	143	229	10	23	14	13	445

CUBA

Habana—Communicable diseases—4 weeks ended September 26, 1936.—During the 4 weeks ended September 26, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13	2	Poliomyelitis	[1] 2	1
Dysentery (bacillary)	15	7	Scarlet fever	1	
Leprosy	1		Tuberculosis	16	5
Malaria	[1] 118	4	Typhoid fever	[1] 55	12

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended September 19, 1936.—During the 4 weeks ended September 19, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		3		5	1	6	15
Chicken pox				1	1		2
Diphtheria				1		2	3
Hookworm disease					1	1	2
Leprosy		1				4	5
Malaria	229	116	11	166	170	529	1,221
Measles		2		1	2	1	6
Poliomyelitis			2	2		1	5
Rabies		1					1
Tuberculosis	7	28	18	20	21	29	123
Typhoid fever	31	56	21	62	17	21	209

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 25, 1936, pages 1318–1361. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 30, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina.—From September 16–30, 1936, 1 fatal case of bubonic plague was reported in Isca Yacu, Santiago del Estero Province, Argentina. During the same period, 1 case and 5 suspected cases of pneumonic plague were reported in Mascio, Tucuman Province.

Hawaii Territory—Island of Hawaii—Hamakua District.—On October 1, 1936, 3 rats, found in Paauhau Sector, Hamakua District, Island of Hawaii, were proved plague infected. On October 5, 1936, 1 rat, found in Hamakua Mill Company Sector, also located in Hamakua District, was proved plague infected.

United States—California.—A report of plague infection in fleas taken from ground squirrels in San Bernardino County, Calif., appears on page 1445 of this issue of the PUBLIC HEALTH REPORTS.

Typhus Fever

Bolivia.—During the month of August 1936, 29 cases of typhus fever were reported in Bolivia.

Yellow Fever

Nigeria—Ilorin Province.—On September 21, 1936, a death from suspected yellow fever was reported in Yasikera, Ilorin Province, Nigeria.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 — OCTOBER 23, 1936 — No. 43

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

September 6–October 3, 1936

Poliomyelitis.—The number of reported cases of poliomyelitis rose from 626 for the 4 weeks ended September 5 to 1,027 for the current 4-week period. States in which the disease has been considerably above the seasonal expectancy were as follows: Illinois, 245 cases; Ohio, 102; Tennessee, 85; California, 54; Alabama and Georgia, 40 each; Colorado, 29; Mississippi, 18; and Maine, 11. More than 60 percent of the total cases occurred in these 9 States. Other States reported about the normal seasonal incidence.

For the country as a whole the current incidence was about 40 percent of that for the corresponding period in 1935 and slightly above the average for the 3 preceding years. The incidence since the first of the year and the trend during recent weeks, along with comparative figures for preceding years, are given in the accompanying table.

In Alabama the peak seems to have been passed, but in Tennessee the number of cases is still high. In Illinois, Ohio, and other North Central States more cases were reported during the last few weeks than at any other time this year.

An epidemic in 1935 that started in North Carolina was rather generally felt in the northern States of the South Atlantic region and in all States in the North Atlantic region. The first significant rise for this season was reported from the South Central States; the other States reporting a high incidence are quite widely scattered over the various sections of the country. In 1934 the disease was epidemic in California and the West. While the peak of that outbreak occurred earlier in the summer, the number of cases continued on a relatively high level until late in October.

Influenza.[2]—The number of cases of influenza reported for the 4 weeks ended October 3 was 1,225. For the corresponding period in the years 1935, 1934, and 1933 the cases numbered 1,956, 1,777, and 2,137, respectively. Practically every section of the country reported

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The numbers of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 47; diphtheria, 48; scarlet fever, 48; influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

[2] See Influenza Mortality in the United States, 1936, by Mary Gover. Public Health Reports, Oct. 9,

a slight increase over the preceding 4-week period, but an increase of influenza cases is normally expected at this season of the year, and there was no indication of anything more than a normal increase. The Mountain and Pacific regions reported a very slight increase over last year; the North Atlantic regions reported approximately the same incidence, and in all other regions the disease was considerably less prevalent than at this time last year.

Poliomyelitis cases reported in each State during recent weeks of 1936

Division and State	41 weeks ended—				Cases reported in 1936 for week ended—									
	Oct. 14, 1933	Oct. 13, 1934	Oct. 12, 1935	Oct. 10, 1936	Aug. 8	Aug. 15	Aug. 22	Aug. 29	Sept. 5	Sept. 12	Sept. 19	Sept. 26	Oct. 3	Oct. 10
All States [1]	4,115	6,292	9,296	3,111	138	147	133	161	182	218	212	277	290	264
New England:														
Maine	46	15	119	35	0	6	0	1	1	4	1	6	0	0
New Hampshire	6	8	52	3	0	0	0	0	0	0	0	0	0	0
Vermont	20	8	33	9	1	0	0	0	0	0	0	0	0	0
Massachusetts	342	66	1,240	50	2	1	2	3	0	4	1	1	1	2
Rhode Island	16	1	305	2	0	0	0	0	0	0	0	0	0	0
Connecticut	64	14	351	12	1	1	1	0	1	0	0	3	0	1
Middle Atlantic:														
New York	1,247	203	2,615	171	8	7	11	10	20	11	12	16	6	9
New Jersey	219	62	415	26	0	0	1	2	1	1	1	2	1	2
Pennsylvania	340	105	160	88	3	5	1	6	5	7	8	1	11	7
East North Central:														
Ohio	283	221	80	180	4	11	8	14	2	18	17	27	40	24
Indiana	37	48	30	39	1	1	1	1	1	2	3	7	3	10
Illinois	192	176	201	483	11	9	15	10	30	52	48	75	70	95
Michigan	79	185	550	98	3	4	3	3	5	2	11	9	15	18
Wisconsin	37	89	55	35	0	0	0	1	1	4	4	4	6	7
West North Central:														
Minnesota	268	67	58	22	0	0	1	2	0	1	3	3	8	2
Iowa	33	26	44	47	1	2	0	2	3	7	4	7	9	5
Missouri	31	29	30	36	3	0	1	1	2	5	4	2	0	5
North Dakota	75	10	10	12	0	0	0	0	0	0	2	2	2	0
South Dakota	25	35	7	10	0	1	2	0	2	0	0	1	2	1
Nebraska	13	13	13	16	0	0	0	0	1	3	0	3	2	0
Kansas	44	59	24	48	0	2	0	1	0	5	3	4	10	6
South Atlantic:														
Delaware	14	3	5	1	0	0	0	1	0	0	0	0	0	0
Maryland	31	20	87	24	1	0	0	0	1	1	7	5	1	2
District of Columbia	6	8	78	7	0	0	0	1	0	0	0	1	3	1
Virginia	32	62	661	47	2	6	4	5	4	2	5	3	3	0
West Virginia	74	75	37	40	2	2	0	1	3	4	7	4	7	1
North Carolina	21	38	631	39	2	7	0	0	1	2	1	1	0	0
South Carolina	18	10	28	16	2	0	0	1	0	0	0	0	0	0
Georgia	5	17	18	87	6	2	1	10	5	12	9	11	8	7
Florida	8	14	15	27	0	3	0	4	2	0	1	0	9	1
East South Central:														
Kentucky	37	97	273	56	4	6	5	7	4	1	1	1	3	4
Tennessee	101	50	71	303	26	20	21	19	22	21	17	23	24	15
Alabama	22	42	70	380	26	22	21	16	5	15	13	6	6	9
Mississippi	8	20	12	110	12	11	10	15	18	5	6	3	4	4
West North Central:														
Arkansas	10	11	21	9	0	0	1	0	1	0	1	1	0	1
Louisiana	22	13	86	22	1	0	2	0	8	1	2	1	1	1
Oklahoma	20	11	10	11	0	0	1	0	0	1	1	0	2	0
Texas	37	102	64	33	0	2	1	1	1	1	5	2	1	1
Mountain: [1]														
Montana	7	285	5	15	0	0	1	0	1	1	0	1	1	4
Idaho	1	115	1	13	1	2	1	0	0	2	1	0	0	0
Wyoming	11	7	2	6	0	0	0	0	0	1	2	0	2	0
Colorado	6	15	9	44	0	2	0	2	2	4	8	9	8	1
New Mexico	6	16	6	18	0	0	0	1	2	0	4	4	1	2
Arizona	11	102	15	5	0	0	0	0	0	0	2	0	0	0
Utah	7	11	6	3	0	0	0	0	0	1	0	0	1	0
Pacific:														
Washington	60	617	26	57	5	3	2	2	7	2	10	5	4	4
Oregon	23	61	13	25	1	1	1	0	0	2	2	5	2	2
California	100	3,030	662	282	9	8	11	12	25	13	15	18	18	10

[1] Nevada excluded; no data.

Typhoid fever.—The number of cases of typhoid fever (2,340) for the country as a whole was the lowest reported for this period in the 8 years for which these data are available, and this low prevalence obtained in each geographic region. In the North Central, South Atlantic, and Mountain and Pacific regions the current incidence was only slightly below the level of last year, but the North Atlantic and South Central regions reported more than 15-percent decreases.

Scarlet fever.—An increase of scarlet fever is normally expected at this season of the year. The number of reported cases for the 4 weeks ended October 3 was 5,215, as against 3,472 for the preceding 4-week period. In relation to recent years the current incidence was low, approximately 8,000 cases being reported for this period in each of the 4 preceding years. The seasonal increase was apparent in all sections of the country, but the current figures for each geographic region were considerably below those for the corresponding periods in recent years.

Smallpox.—The incidence of smallpox has about returned to the normal seasonal level. For the current 4-week period there were 123 cases reported, as compared with 109, 102, 131, and 130 for the corresponding period in the 4 preceding years. Montana reported 26 cases, South Dakota 20, and Illinois 19; but in other States in the Western and North Central regions, where the disease has been unusually prevalent, the incidence dropped to about normal expectancy. Atlantic Coast and South Central regions reported a very low incidence.

Measles.—The incidence of measles was relatively low, the number of cases for the current period being 1,183 as compared with 2,306, 3,031, and 2,026 for the corresponding period in the years 1935, 1934, and 1933, respectively. Each geographic region shared in the favorable situation that now exists after the unusually high incidence of measles that prevailed during 1935 and 1934.

Diphtheria.—Diphtheria continued at a very favorable level. For the 4 weeks ended October 3 the number of cases reported was 2,248 as compared with 3,821, 3,566, and 4,830 for the corresponding period in the years 1935, 1934, and 1933, respectively. Among the various geographic regions the decreases from last year's figures for this period ranged from 15 percent in the South Atlantic region to more than 70 percent in the West North Central region.

Meningococcus meningitis.—For the country as a whole the number of cases (237) of meningococcus meningitis was practically on a level with that reported for the corresponding period in 1935, but it was considerably above the numbers for the 3 preceding years, when the cases reported for this period numbered 135, 130, and 179, respectively. The East North Central, South Atlantic, and South Central regions reported slight increases over last year; in other regions the disease

was less prevalent. Of the total number of cases more than 60 percent were reported from the following States: New York, 24; Kentucky, 22; Illinois, 16; Tennessee and Pennsylvania, 14 each; Maryland and Ohio, 13 each; Virginia, West Virginia, and South Carolina, 11 each. The remaining cases were widely distributed among the other States.

Mortality, all causes. The average mortality rate for large cities for the 4 weeks ended October 3 as reported by the Bureau of the Census was 10.0 per thousand population (annual basis). The rates for the corresponding periods in 1935, 1934, and 1933 were 10.0, 9.9, and 9.8, respectively.

REVIEW OF PLAGUE IN SEATTLE IN 1907 AND SUBSEQUENT RAT AND FLEA SURVEYS

The Public Health Service has recently published a review of an outbreak of human plague which occurred in Seattle nearly 30 years ago and the measures which have been undertaken since that time in the investigation and eradication of the infection.[1]

The purpose of this review was to collect and preserve data dealing with the original outbreak of plague and the measures enforced in eradicating it, to give a history of rodent plague in Seattle, to report the activities of the Seattle rat laboratory, and to give the results of various flea surveys.

Three cases of human plague occurred in Seattle late in October 1907—one bubonic and two of the pneumonic type. Three other deaths occurred in Seattle at that time presenting symptoms of pneumonic plague, although they were not diagnosed as such. Two of these cases occurred in the family in which the known cases of pneumonic plague occurred, and one case was probably the source of infection for three female members of his family. No other case of human plague was discovered, although rodent plague continued for 10 years within the city.

Two campaigns for the eradication of plague were conducted in Seattle, both under the direction of the United States Public Health Service. The first campaign was undertaken on the discovery of plague cases in October 1907 and was continued for only a few months. The second campaign followed the discovery of a greatly increased number of plague-infected rats in 1913 and was continued for 3 years through the efforts of a Public Health Service officer, Dr. B. J. Lloyd. These campaigns accomplished much in improving sanitary conditions along the water front and in the business district of the city, but the author is of the opinion that a low *cheopis* index, together with extensive regrading and rebuilding, were factors of importance in the elimination of rodent plague.

[1] Review of Plague in Seattle (1907) and Subsequent Rat and Flea Surveys. By L. D. Fricks, medical director Public Health Bulletin No. 232. Government Printing Office, Washington, 1936.

Rodent plague persisted in Seattle for at least 10 years, November 1907 to March 1917, during which time 84 plague-infected rats were discovered, 54 of these being found in 1913 and 1914.

A rat laboratory was maintained in Seattle by the Public Health Service and the city health department for nearly 26 years, November 1907 to June 30, 1933. A continuous sampling of the rat population was carried on in which approximately 500,000 rats were examined for plague infection.

Detached observations of rat-flea prevalence were first undertaken in 1908 and two flea surveys were made. All the information gathered on this subject goes to show a low *cheopis* index. In the last survey extending from January 1930 to April 1932 the *cheopis* index was 0.4 plus.

The author concludes that, while conditions are unfavorable for the spread of bubonic plague in Seattle at the present time, the same cannot be said for pneumonic plague. Therefore every precaution should be taken to prevent the reintroduction of the infection.

THE EFFECT OF VIBRION SEPTIQUE TOXIN ON ANIMALS

The anaerobe *Vibrion septique* produces a specific toxin which brings about striking results when inoculated intravenously into laboratory animals, particularly rabbits. It is almost unique in the rapidity of its action on this animal. The period of incubation is almost nonexistent in some cases or so short that the question has been raised whether the action is that of a true toxin. The effects produced may, however, be prevented by neutralization with an antitoxin.

An experimental study was made dealing with (1) the relation of the amount of toxin administered to the length of survival of animals, (2) the action of the toxin, (3) the action of the toxin by routes other than the intravenous route, and (4) a detailed histopathologic study of its pathologic action in rabbits, guinea pigs, mice, and pigeons. The report on this study has recently been published by the Public Health Service.[1]

The study shows rather conclusively that the toxin of *Vibrion septique* has powerful cardiotoxic properties, if not an especial affinity for the heart. In this organ, hydropic, granular, and colloid droplet degeneration of smaller or larger groups of muscle fibers were seen in all stages of the intoxication. Zenker's necrosis was the essential and most important lesion, and it was found in some degree in practically all animals. It is probably the cause of death and the explanation for the recorded pathologic physiology.

[1] The Experimental Pathology and Pathologic Histology Produced by the Toxin of Vibrion Septique in Animals. By Joseph G Pasternack and Ida A. Bengtson. National Institute of Health Bull. No. 168. Government Printing Office, Washington, 1936.

In the literature there is no mention of the nephrotoxic properties of the specific toxin of *Vibrion septique*. Intravenous inoculations produce lesions quickly and rather regularly in rabbits, mice, guinea pigs, and pigeons. The kidneys exhibited all grades of colloid droplet degeneration and necrosis of the labyrinthine tubules. The glomerular tufts showed various stages of thrombosis and thrombonecrosis, and characteristic glomerular blood cyst formation.

The other organs showed degenerative lesions of variable degree, but generally of less severity than the lesions produced in the heart and kidneys, and with much less regularity.

The observations recorded disclose certain facts that appear to be important in understanding the pathologic physiology of acute, fatal "gas" gangrene in man, in which this organism is an agent.

DEATHS DURING WEEK ENDED OCT. 3, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 3, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,285	7,252
Deaths per 1,000 population, annual basis	10.2	10.1
Deaths under 1 year of age	556	466
Deaths under 1 year of age per 1,000 estimated live births	50	43
Deaths per 1,000 population, annual basis, first 40 weeks of year	12.2	11.4
Data from industrial insurance companies:		
Policies in force	68,530,210	67,681,475
Number of death claims	11,114	10,858
Death claims per 1,000 policies in force, annual rate	8.4	8.4
Death claims per 1,000 policies, first 40 weeks of year, annual rate	10.0	9.7

STATE AND INSULAR HEALTH AUTHORITIES, 1936

DIRECTORY, WITH DATA AS TO APPROPRIATIONS AND PUBLICATIONS

Directories of the State and insular health authorities of the United States for each year from 1912 to 1935, except 1932, have been published in the Public Health Reports and reprinted as separates [1] for the information of health officers and others interested in public-health activities. The present directory (1936), like those previously issued, has been compiled from information furnished by the respective State and insular health officers and includes data as to appropriations and publications.

Where an officer has been reported to be a "whole-time" health officer, that fact is indicated by an asterisk (*). For this purpose a "whole-time" health officer is defined as "one who does not engage in the practice of medicine or in any other business but devotes all of his time to official duties."

[1] Reprints nos. 83, 123, 190, 268, 344, 405, 488, 544, 605, 706, 775, 871, 949, 1043, 1106, 1188, 1254, 1334, 1425, 1522, 1604, 1675, and 1724, from the Public Health Reports.

ALABAMA DEPARTMENT OF PUBLIC HEALTH

Board of censors of the medical association of the State of Alabama, acting as a State committee of public health:
Bibb Graves, governor, ex officio chairman, Montgomery.
E. V. Caldwell, M. D., chairman, Huntsville.
M. Y. Dabney, M. D., Birmingham.
M. S. Davie, M. D., Dothan.
S. A. Gordon, M. D., Marion.
Fred W. Wilkerson, M. D., Montgomery.
J. D. Perdue, M. D., Mobile.
W. D. Partlow, M. D., Tuscaloosa.
Walter F. Scott, M. D., Birmingham.
K. A. Mayor, M. D., Lower Peach Tree.
T. Brannon Hubbard, M. D., Montgomery.
Bureau of administration:
Executive health officer:
*J. N. Baker, M. D., State health officer, Montgomery.
*Bessie A. Tucker, secretary to State health officer, Montgomery.
*G. S. Savage, financial secretary, Montgomery.
Bureau of county organization:
*Douglas L. Cannon, M. D., director, Montgomery.
*J. S. Hough, M. D., field adviser in county organization, Montgomery.
*A. M. Shelamer, M. D., field adviser in county organization, Montgomery.
Bureau of communicable disease control:
*D. G. Gill, M. D., D. P. H., director, Montgomery.
*W. H. Y. Smith, M. D., C. P. H., assistant director, Montgomery.
*R. A. Brown, M. D., clinician, Montgomery.
*K. N. Joseph, M. D., clinician, Montgomery.
*Myrtle Martin, R. N., Montgomery.
*Mary S. Pugh, R. N., Montgomery.
Bureau of hygiene and nursing:
*B. F. Austin, M. D., director, Montgomery.
*J. J. Repa, M. D., pediatrician, Montgomery.
*Sarah Brooks, R. N., Montgomery.
*Gladys Prestwood, R. N., Montgomery.
*Maude Pick, R. N., Montgomery.
*Margaret Murphy, R. N., Montgomery.
*Mary Lee Morris, R. N., Montgomery.
Bureau of laboratories:
*James G. McAlpine, Ph. D., general director, Montgomery.
Anniston branch:
*Mary Walker, Anniston.
Birmingham branch:
*George A. Denison, M. D., Birmingham.
Dothan branch:
*Nellie K. Whitfield, Dothan.
Huntsville branch:
*Mrs. Buford Gatlin, Huntsville.
Mobile branch:
*C. H. Waite, Mobile.
Tennessee Valley branch:
*C. C. Johnson, Decatur.
Tuscaloosa branch:
*Cannie Campbell, Tuscaloosa.
Selma branch:
*Cooper Brougher, Selma.
Bureau of sanitation:
*G. H. Hazlehurst, M. C. E., director, Montgomery.
Assistant engineers:
*T. H. Milford, B. S. in C. E., M. S. in San. E., Montgomery.
*Frank B. Wood, B. S. in C. E., Montgomery.
*A. N. Beck, B. S. in C. E., Montgomery.
*R. V. Barnes, B. S. in C. E., Montgomery.
*J. C. Clarke, B. S. in C. E., Montgomery.
*O. G. Quenelle, M. S. in M. E., Montgomery.
Division of inspection:
*C. A. Abele, Ch. E., director, Montgomery.
*H. J. Thrasher, Huntsville.
*F. H. Downs, B. S. in D. H., Montgomery.
Bureau of vital statistics:
*Leonard V. Phelps, director and registrar, Montgomery.
Appropriation for fiscal year ending September 30, 1936:
Annual appropriation for all health work, including county organization, $400,000. (Subject to proration on basis of available revenue coming into the general fund. This makes amount indeterminate.)

ALASKA DEPARTMENT OF HEALTH

Executive health officer:
Walter W. Council, M. D., commissioner of health, Juneau.
Assistant commissioners of health:
A. D. Haverstock, M. D., Seward.
Rex F. Swartz, M. D., Nome.
Floyd B. Gillespie, M. D., Fairbanks.
Appropriation for 1935-37, $15,200.

ARIZONA STATE BOARD OF HEALTH

State board of health:
B. B. Moeur, Governor, president, Phoenix.
John L. Sullivan, vice president, Phoenix.
George C. Truman, superintendent, secretary, Phoenix.
F. E. Doucette, secretary, business manager, Phoenix.
Fred Ruppelius, statistician, Phoenix.
Ralph Thomas, assistant secretary and auditor, Phoenix.
Executive health officer:
George C. Truman, M. D., State superintendent of health, Phoenix.
State laboratory:
*Robert A. Greene, director, Tucson.
*Marion Stroud, bacteriologist, Phoenix.
*W. B. West, assistant bacteriologist, Tucson.
Division of local health administration:
*George A. Hays, M. D.
Sanitary engineer:
*F. C. Roberts.
County health units:
*A. N. Crain, M. D., medical director, Maricopa County, Phoenix.
*R. B. Durfee, M. D., medical director, Cochise County, Bisbee.
*Lewis H. Howard, M. D., medical director, Pima County, Tucson.
*G. F. Manning, M. D., medical director, Gila County, Globe.
Jack B. Eason, M. D., medical director, Yuma County, Yuma.
Appropriations, year ending June 30, 1937:

Board of health	$15,705
Child hygiene	19,700
State laboratory	9,140

ARKANSAS STATE BOARD OF HEALTH

Board of health:
W. H. Hodges, M. D., president, Malvern.
Thomas Wilson, M. D., Wynne.
J. G. Gladden, M. D., Harrison.
E. D. McKnight, M. D., Brinkley.
L. D. Duncan, M. D., Waldron.
F. O. Mahony, M. D., El Dorado.
Executive health officer:
Wm. B. Grayson, M. D., State health officer, Little Rock.
Bureau of vital statistics:
*Mrs. J. B. Collie, statistician, Little Rock.
*Reuben McClure, field agent, Little Rock.
Hygienic laboratory:
*H. V. Stewart, associate director, Little Rock.
*Mildred M. Moss, bacteriologist, Little Rock.
*Mildred S. Fatherree, M. D., bacteriologist, Little Rock.
Bureau of sanitary engineering:
*M. Z. Bair, C. E., chief sanitary engineer, Little Rock.

Bureau of sanitary engineering—Continued.
*Leon McDonald, assistant engineer, Little Rock.
*James P. Slater, assistant State director, malaria-sanitation, Little Rock.
*D. Webster Jones, B. S. A., director, milk control, Little Rock.
Bureau of local health service:
*Gordon Hastings, M. D., M. P. H., assistant State health officer, director, Little Rock.
*T. T. Ross, M. D., M. P. H., director, division of maternal and child health, Little Rock.
*Margaret S. Vaughan, R. N., supervisor, public health nursing, Little Rock.
*Mattie Neely, R. N., chief consultant nurse, division of maternal and child health, Little Rock.
*Gale Morris, accountant.
Training center, Morrilton, Arkansas:
*W. Myers Smith, M. D., M. P. H., director.
*W. P. Scarlett, M. D., M P. H., assistant director.
Bureau of communicable diseases:
Appointments pending—director and epidemiologist.
Appropriations for biennial period ending June 30, 1937:

Executive salary and miscellaneous		$19,800
Bureau of vital statistics	$29,800	
Registrars' fees	30,000	
		59,800
Bureau of sanitary engineering		19,000
Hygienic laboratory		18,000
Bureau of local health service		170,000

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

Board of public health:
Howard Morrow, M. D., president, San Francisco.
Edward M. Pallette, M. D., vice president, Los Angeles.
Walter M. Dickie, M. D., director of public health, Sacramento.
Gifford L. Sobey, M. D., Paso Robles.
William R. P. Clark, M. D., San Francisco.
George H. Kress, M. D., Los Angeles.
Gustave Wilson, M. D., Sacramento.
Department of public health:
*Walter M. Dickie, M. D., director of public health, Sacramento.
District health officer:
*Gavin Telfer, M. D., southern division.
Bureau of epidemiology:
*Harlin L. Wynns, M. D., chief, San Francisco.
*Ida May Stevens, supervising morbidity statistician.
Bureau of sanitary inspections:
*Edward T. Ross, chief, Sacramento.
Bureau of vital statistics:
*Marie B. Stringer, chief, Sacramento.
Bureau of registration nurses:
*Helen F. Hanson, chief, Sacramento.
Bureau of tuberculosis:
*Edyth L. M. Tate-Thompson, chief, Sacramento.
Bureau of food and drug inspections:
*M. P. Duffy, chief.
Division of laboratories:
*W. H. Kellogg, M. D., chief, Berkeley.
Bureau of sanitary engineering:
*C. G. Gillespie, C. E., chief, Berkeley.
Bureau of child hygiene:
*Ellen S. Stadtmuller, M. D., chief, San Francisco.
Appropriations, available July 1, 1935, for biennial period ending June 30, 1937 (87th and 88th years):

Administration:	
For support, department of public health	$427,320
Bureau of cannery inspection:	
For support (payable from cannery-inspection funds)	181,170
Bureau of registration of nurses:	
For support (payable from nurses registration funds)	46,700

Appropriations—Continued.
Tuberculosis bureau:
Allotment for support, included in item "for support, department of public health", $20,230.

For subsidies	$1,305,000
Total	1,960,190

Other sources of revenue:
Fees for registration of nurses, $10 each. (Fees for California graduate nurses, $5 only.)
Renewal of registration certificates, $1 each per year.
Licensing of cold-storage warehouses, rated according to capacity, for credit to general fund.
Fines for violation of pure food and drugs acts, for credit to general fund.
Fees for licenses, $50 each, and contributions, for credit to bureau of cannery inspection.
Fees for searches and certified copies of records, for credit to general fund.
Fees for inspection and registration of aviaries, $5 each.
Fees for inspection of clinics and dispensaries, $20 each.
Publications issued by health department:
Biennial report.
Weekly bulletin.
Special bulletins.
General health laws.

COLORADO DIVISION OF PUBLIC HEALTH

State board of health:
Paul J. Connor, M. D., president, Denver.
William P. Gasser, M. D., vice president, Loveland.
R. L. Cleere, M. D., C. P. H., secretary and executive officer, Denver.
G. W. Bumpus, D. O., Denver.
Ura O. Musick, Ph. G., Colorado Springs.
N. M. Burnett, M. D., Lamar.
Ben Beshoar, M. D., Trinidad.
C. A. Davlin, M. D., Alamosa.
Rudolph Albi, M. D., Denver.
Division of administration:
*R. L. Cleere, M. D., C. P. H., secretary and executive officer, Denver.
Division of epidemiology:
*R. L. Cleere, M. D., C. P. H., acting epidemiologist.
Division of social hygiene:
*R. L. Cleere, M. D., C. P. H., director.
Division of plumbing:
*Irving A. Fuller, chief inspector.
Division of bacteriology:
*W. C. Mitchell, M. D., bacteriologist.
Division of sanitary engineering:
*Benjamin V. Howe, sanitary engineer.
Division of vital statistics:
*R. L. Cleere, M. D., C. P. H., State registrar.
Division of food and drugs:
*R. L. Cleere, M. D., C. P. H., acting commissioner.
Division of crippled children:
*Vera H. Jones, M. D., director.
Division of maternal and child health:
*Vera H. Jones, M. D., director.
Division of public health nursing:
*Mary H. Emberton, R. N., supervisor.
Appropriations for fiscal years ending June 30, 1936 and 1937:

	1936	1937
Salaries	$31,330	$31,390
Laboratory equipment and supplies	1,250	1,250
Printing	1,900	1,900
Traveling expenses	4,500	4,500
Venereal disease	(1)	(1)
Incidental expenses	1,100	1,100
Total	40,080	40,140

[1] No appropriation.

CONNECTICUT DEPARTMENT OF HEALTH

Public health council:
- C. E. A. Winslow, D. P. H.
- James W. Knox.
- James A. Newlands.
- David R. Lyman, M. D.
- Robert A. Cairns, C. E.
- Joseph M. Ganey, M. D.

Executive health officer:
- *Stanley H. Osborn, M. D., C. P. H., commissioner of health, Hartford.

Bureau of preventable diseases:
- *Millard Knowlton, M. D., C. P. H., director.

Bureau of vital statistics:
- *William C. Welling, director.

Bureau of public-health nursing:
- *Elizabeth S. Taylor, R. N., director.

Bureau of child hygiene:
- *A. Elizabeth Ingraham, M. D.

Bureau of public-health instruction:
- *Elizabeth C. Nickerson, C. P. H.

Bureau of laboratories:
- *F. Lee Mickle, director.

Bureau of sanitary engineering:
- *Warren J. Scott, director.

Bureau of occupational diseases:
- *Albert S. Gray, M. D., director.

Bureau of venereal diseases:
- *Henry P. Talbot, M. D., M. P. H., director.

Bureau of mental hygiene:
- *James M. Cunningham, M. D., director.

Division of mouth hygiene:
- *Franklin M. Erlenbach, D. M. D., chief.

Division of medical registration:
- *Ruth H. Monroe, chief.

Appropriation for fiscal period ending June 30, 1937 (2 years), $609,020.

Publications issued by health department:
- Weekly bulletin.
- Monthly bulletin.
- Annual vital-statistics report.
- Annual report of State department of health.
- Miscellaneous pamphlets.

DELAWARE STATE BOARD OF HEALTH

State board of health:
- Stanley Worden, M. D., president, Dover.
- Mrs. F. G. Tallman, vice president, Wilmington.
- Mrs. Arthur Brewington, secretary, Delmar.
- R. E. Ellegood, M. D., Wilmington.
- Mrs. Charles Warner, Wilmington.
- J. P. Wintrup, D. D. S., Wilmington.
- Bruce Barnes, M. D., Seaford.
- M. I. Handy, M. D., Wilmington.

Executive health officer:
- *Arthur C. Jost, M. D., C. M., Dover.

Directory of laboratory:
- *R. D. Herdman, Dover.

Director of communicable disease control:
- *J. R. Beck, M. D., Dover.

Director of maternal and child health:
- *Woodbridge E. Morris, M. D., Dover.

Sanitary engineer:
- *R. C. Beckett, Dover.

Superintendent of Brandywine Sanatorium:
- *L. D. Phillips, M. D., Marshallton.

Superintendent of Edgewood Sanatorium:
- *Elizabeth Van Vranken, R. N., Marshallton.

State supervisor of nurses:
- *Mrs. Kathryn Trent, R. N., Dover.

State oral hygienist:
- *Miss Margaret Jeffreys, R. D. H., Dover.

County unit officers:
- *J. R. Downes, M. D., New Castle County.
- *E. F. Smith, M. D., Kent County.
- *F. I. Hudson, M. D., Sussex County.

Appropriations for the fiscal year ending June 30, 1937:

General administration	$84,150
Hygienic laboratory	10,425
Edgewood Sanatorium for colored tuberculous patients	27,400
Brandywine Sanatorium for white tuberculous patients	121,200
Dental hygiene	12,000
Total	255,175
Special construction at Brandywine Sanatorium	$150,000

Publications:
- Annual report.
- Bulletins on health subjects.
- Weekly circular

DISTRICT OF COLUMBIA HEALTH DEPARTMENT

Executive health officer:
- *George C. Ruhland, M. D., health officer, Washington.

Assistant health officer:
- Daniel L. Seckinger, M. D., Washington.

Chief clerk and deputy health officer:
- *Arthur G. Cole, Washington.

Chief, Bureau of Preventable Diseases, and director, bacteriological laboratory:
- *James G. Cumming, M. D., Washington.

Bacteriologist:
- *John E. Noble, Washington.

Serologist:
- *Jesse P. Porch, D. V. M., Washington.

Maternity welfare:
- J. Bay Jacobs, M. D., medical director.

Bureau of Nursing:
- Mrs. Josephine Pittman Prescott, director.

Bureau of tuberculosis:
- *A. Barklie Coulter, M. D., director.

Chemist:
- *John B. Reed, Washington.

Chief sanitary inspector:
- *J. Frank Butts, Washington.

Director child-hygiene service:
- *Hugh J. Davis, M. D., Washington.

Chief food inspector:
- *Reid R. Ashworth, D. V. S., Washington.

Chief medical and sanitary inspector of schools:
- *Joseph A. Murphy, M. D., Washington.

Chief, bureau of vital statistics:
- *Joseph B. Irvine, Washington.

Poundmaster:

Appropriations for the fiscal year ending June 30, 1937:

Salaries	$185,790
Prevention of communicable diseases	32,500
Milk and food inspection and regulation	7,000
Dispensary service, including treatment of tuberculosis and venereal diseases	45,380
Maintaining a child-hygienic service	25,000
Hygiene and sanitation, public schools	84,000
Laboratory service	3,300
Nursing service	120,400
Miscellaneous	4,600
Total	507,970

Publications issued by health department:
- Weekly report by health department.
- Annual report of health officer.
- Monthly statement of average grade of milk and ice cream sold.

FLORIDA STATE BOARD OF HEALTH

Board of health:
- N. A. Baltzell, M. D., president, Marianna.
- R. L. Hughes, M. D., Bartow.
- Shaler Richardson, M. D., Jacksonville.

Executive health officer:
- *W. A. McPhaul, M. D., State health officer, Jacksonville.

Diagnostic laboratories:
- *Paul Eaton, M. D., D. P. H., director, Jacksonville.

Bureau of vital statistics:
- *Stewart G. Thompson, D. P. H., director, Jacksonville.

Bureau of sanitation:
- *T. S. Kennedy, M. D., director, Jacksonville.

Division of public health nursing:
- *Ruth E. Mettinger, R. N., director.

Division of drug inspection:
- M. H. Doss, chief inspector, Jacksonville.

Bureau of maternal and child health:
- E. Bryant Woods, M. D., director.

Bureau of county health work:
- J. T. Googe, M. D., director.

Bureau of epidemiology:
John Phair, M. D., acting director.
Appropriation for health department:
One-half mill tax levied upon the assessable property of the State for the year ending June 30, 1936, and the same for the year ending June 30, 1937, but expenditures thereunder limited to $225,000 for each fiscal year.
Publications issued by health department:
Pamphlets covering all phases of public health.
Public health information disseminated through the weekly and daily papers of the State.
Florida health notes.
Annual reports.

GEORGIA DEPARTMENT OF PUBLIC HEALTH

State Board of Health:
Cleveland Thompson, M. D., Millen, First District.
C. K. Sharp, M. D., Arlington, Second District.
R. C. Ellis, Americus, Third District.
M. M. Head, M. D., Zebulon, Fourth District.
R. F. Maddox, Atlanta, Fifth District.
A. R. Rozar, M. D., Macon, Sixth District.
M. M. McCord, M. D., Rome, Seventh District.
H. W. Clements, M. D., Adel, Eighth District.
L. C. Allen, M. D., Hoschton, Ninth District.
W. A. Mulherin, M. D., Augusta, Tenth District.
T. C. Marshall, Ph. G., State at large, Atlanta.
W. T. Edmonds, State at large, Augusta.
J. G. Williams, D. D. S., State at large, Atlanta.
Paul McGee, D. D. S., State at large, Waycross.
Executive health officer:
*T. F. Abercrombie, M. D., director, Atlanta.
*J. P. Bowdoin, M. D., assistant director.
Division of venereal-disease control:
*Joe P. Bowdoin, M. D., chief, Atlanta.
Division of county health work:
*Guy G. Lunsford, M. D., chief, Atlanta.
Division of laboratories:
*T. F. Sellers, M. D., chief, Atlanta.
Division of sanitary engineering:
*L. M. Clarkson, chief, Atlanta.
Division of tuberculosis control:
*H. C. Schenck, M. D., chief, Atlanta.
Bureau of vital statistics:
*Butler Toombs, chief, Atlanta.
Division of child hygiene:
*Joe P. Bowdoin, M. D., chief, Atlanta.
Division of epidemiology:
*C. D. Bowdoin, M. D., chief.
Division of accounting and purchasing:
*C. L. Tinsley, chief, Atlanta.

Appropriations for the fiscal years ending Dec. 31, 1934 and 1935:
General appropriation $125,000
Scaled proportionately to State income. Only 80 percent, or $100,000, will be paid on 1935 appropriation.

TERRITORY OF HAWAII BOARD OF HEALTH

Board of health:
F. E. Trotter, M. D., president and executive health officer, Honolulu.
W. B. Pittman, attorney general, Honolulu.
Guy C. Milnor, M. D., Honolulu.
Donald S. Bowman, Honolulu.
Edwin Lewis, Honolulu.
Clarence A. MacGregor, Honolulu.
Harry L. Kerr, Honolulu.
Executive health officer:
*F. E. Trotter, M. D., president of the board of health, Honolulu.
Secretary:
*Florence S. Orr, Honolulu.
Health officer, island of Hawaii:
*Joseph S. Caceres, Hilo.
Health officer, island of Kauai:
A. M. Ecklund, M. D., Koloa.
Tuberculosis bureau:
*C. Alvin Dougan, M. D., director, Honolulu.
Bureau of public health nursing:
*Mary Williams, director, Honolulu.
Bureau of communicable diseases:
*James R. Enright, M. D., director, Honolulu.
Laboratory technician:
*Alison Watt, Honolulu.
Bureau of maternal and infant hygiene:
Frederick K. Lam, M. D., director, Honolulu.
Bureau of sanitation:
*S. W. Tay, director, Honolulu.
*Fred Schultz, division supervisor, Honolulu.
*Clifford H. Bowman, division supervisor, island of Hawaii, Hilo.
*R. C. Lane, division supervisor, island of Maui, Wailuku.
*A. P. Christian, division supervisor, island of Kauai, Lihue.
*Robert B. Pauole, sanitary inspector, Leward Molokai, Kaunakakai.
Bureau of pure food and drugs:
*M. B. Bairos, director, Honolulu.
Territorial hospital:
*A. B. Kroll, superintendent, Kaneohe, Oahu.
*A. B. Eckerdt, M. D., medical director, Kaneohe, Oahu.
Bacteriologist, island of Hawaii:
*Fred S. Paine, Hilo.
Bacteriologist, island of Maui:
Haliburton McCoy, M. D., Puunene.
Bacteriologist, island of Kauai:
A. M. Ecklund, M. D., Koloa.
Appropriations, biennium 1935–37:

Board of health—general administration:		
Personal services	$50,698.00	
Other current expenses	6,274.94	
Equipment	825.06	
		$57,798.00
Bureau of vital statistics:		
Personal services	20,243.52	
Other current expenses	5,000.00	
Equipment	350.00	
		25,593.52
Tuberculosis bureau:		
Personal services	15,742.08	
Other current expenses	9,100.00	
Equipment	700.00	
		25,542.08
Tuberculosis—private hospitals:		
Contributions to Leahi Home	172,000.00	
Contributions to Kula Sanitarium	96,000.00	
Contributions to Samuel Mahelona Memorial Hospital	66,000.00	
		334,000.00
Bureau of public-health nursing:		
Personal services	159,802.98	
Other current expenses	35,173.83	
Equipment	3,500.64	
Motor vehicles	24,069.53	
		222,546.98
Plague campaign:		
Personal services	63,212.52	
Other current expenses	23,772.34	
Equipment	585.19	
Motor vehicles	2,304.47	
Structures and permanent improvements	350.00	
		90,224.52
Bureau of communicable diseases:		
Personal services	36,064.80	
Other current expenses	20,000.00	
Equipment	905.41	
Motor vehicles	1,527.59	
		58,497.80
Bureau of maternal and infant hygiene:		
Personal services	7,594.56	
Other current expenses	6,550.00	
		14,144.56
Bureau of pure food and drugs:		
Personal services	15,327.36	
Other current expenses	1,122.00	
Equipment	135.00	
		16,584.36
Board of examiners:		
Personal services	233.28	
Other current expenses	346.00	
		579.28

Bureau of sanitation:

Personal services	$118,[illegible].81	
Other current expenses	18,[illegible].00	
Equipment	[illegible].00	
Motor vehicles	3,087.00	
		[illegible]1[illegible],1[illegible].81

Government physicians:

Personal services		79,7[illegible]8.33

Territorial hospital for insane:

Personal services	[illegible]0,[illegible]3.58	
Other current expenses	21[illegible],[illegible].00	
Equipment	11,0[illegible]7.00	
Motor vehicles	5,000.00	
Structures and permanent improvements	15,2[illegible]0.00	
		702,395.58
Total		1,769,830.88

IDAHO DEPARTMENT OF PUBLIC WELFARE

Department of public welfare:
*Lewis Williams, commissioner.
*W. V. Leonard, B. S. M. E., State chemist and sanitary engineer.
*Lawrence J. Peterson, bacteriologist.
*A. W. Klotz, assistant chemist.
*James M. Welsh, dairy food, drug, hotel, and sanitary inspector.
*C. H. Watson, dairy, food, drug, hotel, and sanitary inspector.
Division of public health:
Executive health officer:
*J. D. Dunshee, M. D., director, Boise.
Bureau of local health service:
*L. A. Lambert, M. D.
Bureau of maternal and child health and crippled children:
*Carlyle Thompson, M. D.
Bureau of sanitary engineering:
*W. V. Leonard.
Bureau of laboratories:
*L. J. Peterson.
Bureau of public health nursing:
*Kathryn McCabe.
Bureau of vital statistics:
*Pearl Dillingham.

Appropriations for biennial period ending Dec. 31, 1936:

Personal services	$44,560
Other expenses	17,600
Venereal-disease control	2,000
Vaccines and antitoxins	4,000
Child hygiene	3,085
Total	71,245

Other sources of revenue:
Aid through Social Security for public health work, maternal and child health, and crippled children.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH

Board of public health advisors:
Clifford U. Collins, M. D., chairman.
E. J. Doering, M. D.
E. Samuel Munson, M. D.
Maurice Rubel, M. D.
Executive health officer:
*Frank J. Jirka, M. D., director of public health, Springfield.
Assistant director of public health:
*A. C. Baxter, M. D.
Division of sanitary engineering:
*Clarence W. Klassen, C. E., chief sanitary engineer.
Division of communicable diseases:
*J. J. McShane, M. D., D. P. H., chief.
Division of child hygiene and public-health nursing:
*Grace S. Wightman, M. D., chief.
Division of tuberculosis:
*A. C. Baxter, M. D., acting chief.
Division of laboratories:
*Howard J. Shaughnessy, Ph. D., chief.
Division of vital statistics:
*Sheldon L. Howard, registrar.
Division of public-health instruction:
*Baxter K. Richardson, chief.
Division of hotel and lodging-house inspection:
Thomas J. O'Grady, superintendent.

Appropriations for biennial period ending June 30, 1937:

Salaries	$707,000
Salaries, State officers	27,800
Office expense	23,176
Traveling expenses	128,661
Operation	261,116
Repairs and equipment	25,875
Contingent	65,000
Printing	50,000
Postage	25,000
Sanitary water-board law	30,000
Rabies	12,000
Emergency	25,000
Total	1,380,628

Publications issued by health department:
Illinois Health Messenger (biweekly).
Weekly statistical bulletin for health officers.
Quarterlies on sanitation of water, milk, swimming pools, sewage disposal.
Newspaper releases and manuscript of radio broadcasts.
Educational health circulars.

INDIANA DEPARTMENT OF COMMERCE AND INDUSTRY, DIVISION OF PUBLIC HEALTH

Board of health:
Ernest Rupel, M. D., president, Indianapolis.
Edmund M. Van Buskirk, M. D., Fort Wayne.
John Clay Glackman, M. D., Rockport.
Verne K. Harvey, M. D., secretary, Indianapolis.
Executive health officer:
*Verne K. Harvey, M. D., C. P. H., director, Indianapolis.
Collaborating epidemiologist and assistant director:
Thurman B. Rice, M. D., Indianapolis.
Epidemiologist:
*J. W. Jackson, M. D., Indianapolis.
Bureau of vital statistics:
H. W. Wright, statistician and registrar, director, Indianapolis.
Bacteriological laboratory:
Clyde G. Culbertson, M. D., director, Indianapolis.
Division of chemistry:
*Martin L. Lang, State food and drug commissioner, Indianapolis.
Bureau of sanitary engineering:
*B. A. Poole, B. S. C. E., director, Indianapolis.
Food and drug laboratory:
*Frank J. Koehne, B. Ch. E., director, Indianapolis.
Bureau of health education:
*Bynum Legg, director, Indianapolis.
Bureau of housing, industrial and school hygiene:
*Fred K. Myles, director, Indianapolis.
Bureau of public health nursing:
*Eva F. MacDougall, R. N., Indianapolis.
Appropriation for fiscal year beginning July 1, 1936, and ending June 30, 1937, $207,300.

IOWA STATE DEPARTMENT OF HEALTH

EX OFFICIO

Clyde L. Herring, governor, Des Moines.
Mrs. Alex Miller, secretary of State, Des Moines.
Leo J. Wegman, treasurer of State, Des Moines.
Ray Murray, secretary of agriculture, Des Moines.
Walter L. Bierring, M. D., State commissioner of health, Des Moines.

APPOINTIVE BY GOVERNOR

Edward M. Myers, M. D., chairman, Boone.
Herbert E. Story, M. D., secretary, Osceola.
William E. Walsh, M. D., Hawkeye.
Walter A. Sternberg, M. D., Mt. Pleasant.
Charles E. Irwin, M. D.

Executive health officer:
*Walter L. Bierring, M. D., commissioner of health, Des Moines.
*Frederick J. Swift, M. D., deputy commissioner, Des Moines.
Division of communicable diseases and epidemiology:
*Carl F. Jordan, M. D., C. P. H., director, Des Moines.
Division of child health and health education:
*J. H. Kinnaman, M. D., director, Des Moines.
Division of public health engineering:
*A. H. Wieters, director, Des Moines.
State hygienic laboratories:
*M. E. Barnes, M. D., director, Iowa City.
Division of public health nursing:
*Edith S. Countryman, R. N., director, Des Moines.
Division of vital statistics:
*R. L. McLaren, director, Des Moines.
Division of licensure and registration:
*H. W. Grefe, director, Des Moines.
Division of law enforcement:
*Herman B. Carlson, director, Des Moines.
Division of barber inspection:
*William B. Wilson, director, Des Moines.
Division of cosmetology inspection:
*Hilda Geerdes, executive secretary, Des Moines.
Housing work is carried on by engineering division.
Medical, dental, optometry, cosmetology, chiropractic, osteopathy, embalming, podiatry, and barber examining boards are combined in the State Department of Health.
Executive secretary:
Albert F. Vogt, Des Moines.
Appropriations for fiscal year ending June 30, 1936:

For salaries, support, maintenance, and miscellaneous purposes	$45,160
For child health and health education	8,500
For inspector salaries, support, maintenance, and miscellaneous	3,940
For public health engineering salaries, support, maintenance, and miscellaneous	19,280
For barber inspection salaries, support, maintenance, and miscellaneous	15,520
For cosmetology inspection salaries, support, maintenance, and miscellaneous	12,040
For the following examining boards: Medical, dental, osteopathy, chiropractic, embalmers, optometry, podiatry	8,755
Total	113,195

Publications:
Biennial report.
Quarterly bulletin.
Weekly health message.

KANSAS STATE BOARD OF HEALTH

Board of health:
George I. Thacher, M. D., president, Waterville.
Clay E. Coburn, M. D., Kansas City.
H. L. Aldrich, M. D., Caney.
Alfred E. O'Donnell, M. D., Ellsworth.
Charles W. Robinson, M. D., Atchison.
W. J. Eilerts, M. D., Wichita.
W. C. Lathrop, M. D., Norton.
J. G. Stewart, M. D., Topeka.
Herbert Smith, M. D., Pittsburg.
A. B. Mitchell, LL. B., Lawrence.
Executive health officer:
*Earle G. Brown, M. D., Secretary State board of health, Topeka.
Division of vital statistics:
*C. L. Miller, M. D., State registrar.
Division of communicable diseases:
*C. H. Kinnaman, M. D., epidemiologist, Topeka.
Division of food and drugs:
*Thomas I. Dalton, Ph. C., assistant chief food and drug inspector, Topeka.
Division of child hygiene:
*H. R. Ross, M. D., chief, Topeka.
Division of sanitation:
Earnest Boyce, chief, Lawrence.
Division of public health education:
*Earle G. Brown, M. D., director, Topeka.
Division of tuberculosis:
*Clifton Hall, M. D., director.
Division of venereal diseases:
*Robert H. Riedel, M. D., director.
Water and sewage laboratories at Kansas University:
Earnest Boyce, director, Lawrence.
Food laboratory at Kansas University:
H. P. Cady, director.
Drug laboratory at Kansas University:
Prof. L. D. Havenhill, director of drug analysis, Lawrence.
Food laboratory at Kansas Agricultural College:
Prof. H. H. King, director of food analysis, Manhattan.
Public health laboratory, Topeka:
*Ross L. Laybourn, bacteriologist, in charge.
Appropriations for year ending June 30, 1936:

	Salaries	Total
Executive	$4,400	$2,000
Division of communicable diseases	8,460	8,000
Division of food and drugs	8,140	6,000
Division of child hygiene	5,835	2,165
Division of cooperative county health work		6,000
Public health laboratory	6,605	3,195
Division of sanitation (engineering, water, and sewage)		2,400
Board members	200	800
Total	33,640	30,560

Other sources of revenue:
Marriage fees, approximately $20,000.
Water and ice analysis fees, approximately $14,000.
Publications issued by health department:
Biennial report.
Weekly morbidity report.

KENTUCKY STATE DEPARTMENT OF HEALTH

Department of health:
E. M. Howard, M. D., president, Harlan.
George S. Coon, M. D., Louisville.
A. T. McCormack, M. D., secretary, Louisville.
J. Watts Stovall, M. D., Grayson.
John H. Blackburn, M. D., Bowling Green.
W. H. Fuller, M. D., Mayfield.
A. W. Davis, M. D., Madisonville.
C. J. Johnson, D. O., Louisville.
James J. Goodwin, Louisville.
Executive officer:
*A. T. McCormack, M. D., D. P. H., State health commissioner, Louisville.
Bureau of county health work:
*P. E. Blackerby, M. D., assistant State health commissioner, Louisville.
*V. A. Stilley, M. D., field director, Benton.
*W. F. Lamb, M. D., field director, Stanford.
*Juanita Jennings, M. D., field director, Louisville.
Bureau of vital statistics:
*J. F. Blackerby, director, Louisville.
Bureau of bacteriology:
*Lillian H. South, M. D., director, Louisville.
Bureau of sanitary engineering:
*F. C. Dugan, C. E., director, Louisville.
Bureau of foods, drugs, and hotels:
*Sarah Vance Dugan, director, Louisville.
Bureau of venereal diseases:

Bureau of public health nursing:
*Margaret L. East, R. N., director, Louisville.
Bureau of maternal and child health:
*Annie S. Veech, M. D., director, Louisville.
Bureau of prevention of trachoma and blindness:
United States Trachoma Hospital:
*Robert Sory, M. D., medical officer in charge.
Bureau of budget:
*Elva V. Grant, director, Louisville.
Bureau of epidemiology:
*F. W. Caudill, M. D., director, Louisville.

Bureau of tuberculosis:
*John B Floyd, M. D., director, Louisville.
State tuberculosis sanatorium:
*Paul A. Turner, M. D., director and superintendent, Louisville.
Bureau of dental health:
J. F. Owen, D. D. S., director, Lexington.
Bureau of public health education:
*John W. Kelly, director.
*Mayme Sullivan, chief clerk.
Bureau of medical registration:
*John G. South, M. D., director, Louisville.
Appropriations for fiscal year ending June 30, 1937:

Central administration for all departments	$157,500
Full-time county health departments	250,500
State tuberculosis sanatorium	44,000
Total	452,000

LOUISIANA DEPARTMENT OF HEALTH

State board of health:
J. A. O'Hara, M. D., president, New Orleans.
S. E. Graham, M. D., Melville.
S. J. Couvillon, M. D., Moreauville.
Jas. O. Sartor, M. D., Rayville.
(Other members to be appointed.)
Fannie B. Nelken, secretary.
Executive health officer:
*J. A. O'Hara, M. D., president, State board of health, New Orleans.
Bacteriologist:
*W. H. Seemann, M. D., New Orleans.
Registrar of vital statistics:
*P. A. Kibbe, M. D., New Orleans.
Bureau of communicable diseases.
C. L. Brown, M. D., New Orleans.
Bureau of public health administration:
*R. W. Todd, M. D., director, New Orleans.
Sanitary engineer:
*John H. O'Neill, New Orleans.
Analyst:
*Cassius L. Clay, New Orleans.
Sanitary inspection:
*Peter Rohrs, Jr., chief, New Orleans.
Auditor:
*Phil Arras, New Orleans.
Appropriations for fiscal years:

1936–37	$430,000
1937–38	430,000

Publications issued by health department:
Quarterly bulletin.
Biennial report.
Miscellaneous leaflets.

MAINE DEPARTMENT OF HEALTH AND WELFARE

Advisory council of health and welfare:
Miss Sally P. Moses, Bangor.
George W. Lane, Jr., Auburn.
Mrs. Helen C. Donahue, Portland.
E. V. Call, M. D., Lewiston.
Irving E. Pendleton, D. M. D., Lewiston.
Bureau of health:
*George H. Coombs, M. D., director, Augusta.
Division of administration:
*George H. Coombs, M. D., director, Augusta.
*Roscoe L. Mitchell, M. D., deputy director, Augusta.
Division of communicable diseases:
*Roscoe L. Mitchell, M. D., Augusta.
Division of laboratories:
*A. H. Morrell, M. D., Augusta.
Division of sanitary engineering:
*Elmer W. Campbell, D. P. H., Augusta.
Division of vital statistics:
*George H. Coombs, M. D., State registrar, Augusta.
Division of social hygiene:
*George H. Coombs, M. D., Augusta.
Division of public health nursing and child hygiene
*Edith L. Soule, R. N., Augusta.
Division of dental hygiene:
*Dorothy Bryant, D. H., Augusta.
Division of maternal and child health and crippled children:
*Herbert R. Kobes, M. D., Augusta.

District health officers:
*J. L. Pepper, M. D., South Portland.
*C. N. Stanhope, M. D., Dover-Foxcroft.
*J. W. Loughlin, M. D., Newcastle.
*B. F. Porter, M. D., Caribou.
*J. A. MacDonald, M. D., Machias.
Appropriations for fiscal year ending June 30, 1936:

Administration	$67,700
District and local health officers	26,200
Venereal-disease control work	10,000
Maternity and child-welfare work	26,000
Branch State laboratory, Caribou	2,900
Aid for typhoid carriers	4,800
Completion of vital records of the State	400
Infantile paralysis control	2,000
Pneumonia control	4,000
Total	144,000

Other sources of revenue:
Census Bureau, Washington, D. C., and miscellaneous receipts, about $2,000.
License fees for camps, eating and lodging places, about $28,000 (estimated).

MARYLAND DEPARTMENT OF HEALTH

Board of health:
Robert H. Riley, M. D., Dr. P. H., chairman, Baltimore.
Thomas S. Cullen, M. D., Baltimore.
Herbert R. O'Conor, attorney general, Baltimore.
Joseph Irwin France, M. D., Port Deposit.
Huntington Williams, M. D., Dr. P. H., Baltimore.
Tolley A. Blays, C. E., Baltimore.
Benjamin C. Perry, M. D., Bethesda.
E. F. Kelly, Phar. D., Baltimore.
George M. Anderson, D. D. S., Baltimore.
Executive health officer:
*Robert H. Riley, M. D., Dr. P. H., director of health, Baltimore.
Division of personnel and accounts:
*Walter N. Kirkman, chief, Baltimore.
Division of oral hygiene:
*Richard C. Leonard, D. D. S., chief, Baltimore.
Division of legal administration:
*J. Davis Donovan, LL. B., chief, Baltimore.
Committee on public health education:
*Gertrude B. Knipp, secretary, Baltimore.
Bureau of communicable diseases:
*Robert H. Riley, M. D., Dr. P. H., chief, Baltimore.
*C. H. Halliday, M. D., epidemiologist, Baltimore.
*C. W. G. Rohrer, M. D., Ph. D., diagnostician, Baltimore.
Bureau of vital statistics:
*Arthur W. Hedrich, chief, Baltimore.
Food and drug commissioner:
*A. L. Sullivan, chief, Baltimore.
Deputy food and drug commissioner:
*R. L. Swain, Phar. D., LL. B.
Bureau of bacteriology:
*C. A. Perry, chief, Baltimore.
Bureau of sanitary engineering:
*Abel Wolman, B. S. E., chief, Baltimore.
Bureau of chemistry:
*William F. Reindollar, chief, Baltimore.
Bureau of child hygiene:
*J. H. Mason Knox, Jr., Ph. D., M. D., chief, Baltimore.
Appropriations for fiscal year ending September 30, 1937, $368,802.
Publications issued by health department:
Annual report.
Weekly News Letter.
Monthly bulletin.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Public health council:
Henry D. Chadwick, M. D., chairman, Boston.
Richard M. Smith, M. D., Boston.
Francis H. Lally, M. D., Milford.
Richard P. Strong, M. D., Boston.
Sylvester E. Ryan, M. D., Springfield.
James L. Tighe, Holyoke.
Gordon Hutchins, Concord.

Executive health officer:
*Henry D. Chadwick, M. D., State Commissioner of public health, Boston.
Secretary:
*Florence L. Wall.
Division of administration:
(Under direction of commissioner.)
Division of communicable diseases:
*Gaylord W. Anderson, M. D., director, Boston.
Division of sanitary engineering:
*Arthur D. Weston, C. E., director and chief engineer, Boston.
Division of biologic laboratories:
*Elliott S. Robinson, M. D., director and pathologist, Boston.
Division of food and drugs:
*Hermann C. Lythgoe, director and analyst, Boston.
Division of child hygiene:
*M. Luise Diez, M. D., director, Boston.
Division of tuberculosis sanatoria:
*Alton S. Pope, M. D., director, Boston.
Division of adult hygiene:
*Herbert L. Lombard, M. D., director, Boston.
Appropriations for department of public health, 1936:

Division of administration:	
Salary of commissioner	$7,500
Personal services	20,070
Services other than personal	9,800
Division of child hygiene:	
Personal services of director and assistants	38,220
Services other than personal	15,000
Personal services in connection with maternal and infant hygiene	25,440
Expenses in connection with maternal and infant hygiene	10,200
Division of communicable diseases:	
Personal services of director, district health officers, etc	75,700
Services other than personal	15,200
Personal services in connection with control of venereal diseases	12,720
Expenses in connection with control of venereal diseases	29,000
Wassermann Laboratory:	
For personal services	17,820
For expenses of laboratory	5,800
Antitoxin and vaccine laboratory:	
For personal services	77,080
Other services	36,500
Inspection of food and drugs:	
For personal services	59,800
Other services	13,000
For administering the shellfish law:	
Personal services	2,040
Other services	870
Water supply and disposal of sewage:	
For personal services	122,350
For other services	27,800
Division of tuberculosis:	
For personal services	37,200
Services other than personal	4,850
For personal services of tuberculosis clinic units	34,050
Services other than personal (clinic units)	13,100
Payment of subsidies	462,000
For maintenance of and for certain improvements at the Lakeville, North Reading, Rutland, and Westfield State sanatoria	1,282,444
Division of adult hygiene:	
For personal services	48,190
For other expenses	49,500
Cancer hospital at Norfolk:	
For maintenance of and for certain improvements	352,575
Total	2,905,819

MICHIGAN DEPARTMENT OF HEALTH

Advisory council of health:

Robert B. Harkness, M. D., Houghton.
U. G. Rickert, D. D. S., Ann Arbor.
Louis J. Hirschman, M. D., Detroit.
E. A. Schilz, M. D., Grand Ledge.

Advisory council of health—Continued.
George J. Curry, M. D., Flint.
Executive health officer:
*C. C. Slemons, M. D., Dr. P. H., State health commissioner, Lansing.
Bureau of engineering:
*E. D. Rich, C. E., director.
*Willard F. Shepard, assistant engineer.
*Raymond J. Faust, C. E., assistant engineer.
*Orla E. McGuire, assistant engineer.
*LaRue L. Miller, assistant engineer.
*C. Theodore Mudgett, assistant engineer.
Bureau of laboratories:
*C. C. Young, Ph. D., D. P. H., director.
*Wm. E. Bunney, Ph. D., associate director, biologic products division.
*Minna Crooks, bacteriologist, associate director.
*G. D. Cummings, Ph. D., assistant director.
*Pearl L. Kendrick, associate director, Western Michigan division.
*Ora M. Mills, associate director, Upper Peninsula division.
*A. Exworthy, analytical chemist.
*Russell Y. Gottschall, Ph. D., bacteriologist.
*A. B. Haw, physiological chemist.
*M. B. Kurtz, D. V. M., serologist.
*C. B. Line, D. V. M., veterinary pathologist.
*Roy W. Pryer, Dr. P. H., immunologist.
*J. T. Tripp, Ph. D., physiological chemist.
*Beulah D. Westerman, Ph. D., bacteriologist.
*M. M. Woodward, toxicological chemist.
Bureau of child hygiene and public health nursing:
*Lillian R. Smith, M. D., director.
Pearl A. Toivonen, M. D., field physician.
*Helen de Spelder Moore, R. N., assistant director.
Bureau of records and statistics:
*W. J. V. Deacon, M. D., director.
*Stuart T. Friant, statistician.
Bureau of education:
*Marjorie Delavan, director.
*Pearl Turner, assistant director.
*Wilbur J. Myers, charge of publications.
*Leah Baldwin, librarian.
*Melita Hutzel, lecturer.
Bureau of communicable diseases.
*C. D. Barrett, M. D., C. P. H., director.
*Filip Forsbeck, M. D., associate director, in charge of typhoid fever control.
*A. W. Newitt, M. D., C. P. H., field epidemiologist, in charge of tuberculosis control.
Richard Sears, M. D., field epidemiologist.
Bureau of mouth hygiene:
*William R. Davis, D. D. S., director.
Bureau of county health administration:
*A. B. Mitchell, M. D., director.
Bureau of industrial hygiene:
*John Hepler, C. E., director.
*Herbert Walworth, chemical engineer.

Appropriations for fiscal year ending June 30, 1937:

Personal services	$220,000
Supplies; Contractual service	101,450
Outlay for equipment	5,500
County health departments	96,000
Smallpox vaccine, toxoid manufacturing	5,000
Beaver Island, physicians	2,500
Antipneumococcus and antimeningococcus products	10,000
Total	443,450

Publications issued by health department:
Monthly bulletin.
Annual report.
Communicable-disease pamphlets.
Sex-hygiene pamphlets.
Child-hygiene pamphlets.
Engineering bulletins.
Mouth-hygiene pamphlets.
Scientific reprint series.
Rules and regulations.

MINNESOTA DEPARTMENT OF HEALTH

Board of health:
Frederic Bass, C. E., president, Minneapolis.
A. S. Milinowski, C. E., vice president, St. Paul.
N. G. Mortensen, M. D., St. Paul.

Board of health—Continued.
- S. Z. Korlan, M. D., Aitkin.
- E. T. Fitzgerald, M. D., Morris.
- Thomas G. Bell, Duluth.
- Erling S. Platou, M. D., Minneapolis.
- O. L. Melby, D. C., Owatonna.
- E. J. Engberg, M. D., St. Paul.

Executive health officer, State Office Bldg., St. Paul:
- *A. J. Chesley, M. D., secretary and executive officer.

Division of administration, State Office Bldg., St. Paul:
- *O. O. Pierson, director.

Division of vital statistics, State Office Bldg., St. Paul:
- *Gerda O. Pierson, director.

Division of hotel inspection, State Office Bldg., St. Paul:
- *Laura E. Naplin, State Hotel Inspector.

Division of preventable diseases (including venereal diseases), University Campus, Minneapolis:
- *O. McDaniel, M. D., director.
- *Lucy Heathman, Ph. D., M. D., assistant director, and chief of laboratories.
- *W. P. Greene, M. D., senior epidemiologist.
- *F. G. Gunlaugson, M. D., epidemiologist.

Division of sanitation, University Campus, Minneapolis:
- *H. A. Whittaker, director.
- *O. E. Brownell, C. E., senior sanitary engineer.

Division of child hygiene, university campus, Minneapolis:
- Everett C. Hartley, M. D., director.
- *Olivia T. Peterson, R. N., superintendent of public-health nursing.

Local health units, State Office Building, St. Paul:
- *Robert N. Barr, M. D., C. P. H., Director, central administration.

Appropriations for fiscal years ending June 30, 1936 and 1937:

	1936	1937
Divisions of administration and vital statistics:		
Salaries	$32,000	$32,000
Expenses	6,200	8,000
Providing free antitoxin and other biologics	15,000	15,000
For aid to typhoid carriers	7,500	7,500
For printing lists of persons licensed to practice the healing arts	450	450
Division of preventable diseases:		
Preventable diseases and laboratory	74,000	74,000
Venereal disease control and venereal disease education	22,000	22,000
Division of sanitation:		
Sanitary engineering and laboratory	25,000	25,000
Stream pollution survey	10,000	10,000
Division of child hygiene:		
Protection for maternity and infancy	22,000	22,000
Indian health work	9,000	9,000
Division of hotel inspection:		
Hotel inspection	34,500	34,500
Total	257,650	259,450

Publications issued by health department:
- Educational pamphlets.

MISSISSIPPI STATE BOARD OF HEALTH

Board of health:
- J. W. Lipscomb, M. D., president, Columbus.
- Felix J. Underwood, M. D., secretary, Jackson.
- S. E. Eason, M. D., New Albany.
- L. B. Austin, M. D., Rosedale.
- H. L. McKinnon, M. D., Hattiesburg.
- B. J. Shaw, M. D., Slate Spring.
- L. W. Brock, M. D., McComb.
- John B. Howell, M. D., Canton.
- W. H. Banks, M. D., Philadelphia.
- William R. Wright, D. D. S., Jackson.

Executive health officer:
- *Felix J. Underwood, M. D., secretary, State board of health, Jackson.

Vital statistics:
- R. N. Whitfield, M. D., director, Jackson.

Child hygiene and public-health nursing:
- *Felix J. Underwood, M. D., acting director, Jackson.
- *Mary D. Osborne, R. N., associate director, public-health nursing, Jackson.
- *Gladys Eyrich, supervisor, oral hygiene, Jackson.

Hygienic laboratory:
- *T. W. Kemmerer, M. D., director, Jackson.

Sanitary engineering:
- *H. A. Kroeze, C. E., director, Jackson.
- *N. M. Parker, D. V. S., State meat and milk supervisor, Jackson.
- *C. M. Ledbetter, assistant State sanitary engineer, Jackson.
- *Floyd Ratliff, State sanitary inspector, Jackson.

County health work:
- *H. C. Ricks, M. D., C. P. H., director, Jackson.
- *John A. Milne, M. D., M. P. H., assistant director, Jackson.
- *Ora E. Phillips, R. N., supervising nurse.
- *Joseph E. Johnston, field supervisor of sanitation, Jackson.

Tuberculosis control:
- *Henry Boswell, M. D., director, Sanatorium.
- *W. D. Hickerson, M. D., clinician, field tuberculosis diagnostic unit, Sanatorium.

Industrial hygiene:
- *J. W. Dugger, M. D., director, Jackson.

Epidemiological unit:
- *A. L. Gray, M. D., M. P. H., director, Jackson.
- *Catherine Mayfield, bacteriologist.
- *Margaret Meade, nurse-investigator.

Health education:
- *Eva Moore Adams, supervisor.
- *Louise Williams, librarian.

State appropriations for period July 1, 1936, to June 30, 1937, $175,000; July 1, 1937, to June 30, 1938, $175,000.

Publications issued by health department:
- Biennial report.
- Health pamphlets.

MISSOURI STATE BOARD OF HEALTH

Board of health:
- T. S. Bourke, M. D., president, Kansas City.
- W. L. Brandon, M. D., vice president, Poplar Bluff.
- F. W. Bailey, M. D., St. Louis.
- W. T. Elam, M. D., St. Joseph.
- P. T. Bohan, M. D., Kansas City.
- E. S. Smith, M. D., Kirksville.
- E. T. McGaugh, B. L., M. D., State health commissioner, Jefferson City.

Executive health officer:
- *E. T. McGaugh, B. L., M. D., State health commissioner, Jefferson City.

Epidemiology:
- *E. K. Musson, M. D., M. P. H., epidemiologist.

Laboratories:
- *O. F. Adams, B. Agr., M. D., director.

Sanitary engineering:
- *Robert Stewart, M. E., assistant chief engineer.

Child hygiene and cooperative county health work:
- *H. S. Gove, M. D., director.

Public health nursing:
- *Miss Helena Dunham, R. N., director.

Appropriations for the State board of health, biennial period, 1935–36:

State board of health:	
Additions	$2,000
Operation	40,000
Personal service	165,000
Total	207,000
Water and sewage fund (from fees):	
Operation	5,000
Personal service	9,000
Total	14,000
Board of health fund (medical licensure, from fees):	
Operation	5,000
Personal service	20,000
Total	25,000

Public health nursing—Continued.
Cosmetology and hairdressing:

Additions	$200
Repairs and replacements	100
Operation	12,000
Personal service	26,000
Total	38,300

Food and drug:

Operation	31,000
Personal service	68,000
Total	102,000

MONTANA DEPARTMENT OF PUBLIC HEALTH

Board of health:
L. H. Fligman, M. D., president, Helena.
George F. Turman, M. D., Missoula.
E. M. Porter, M. D., Great Falls.
B. L. Pampel, M. D., Livingston.
E. G. Balsam, M. D., Billings.
W. F. Cogswell, M. D., secretary, Helena.
Executive health officer:
*W. F. Cogswell, M. D., secretary, Helena.
Division of communicable diseases:
*B. K. Kilbourne, M. D., epidemiologist and director of county health work, Helena.
Division of child welfare:
*Jessie M. Bierman, M. D., director, Helena.
Division of food and drugs:
*J. W. Forbes, director, Helena.
Division of vital statistics:
*W. F. Cogswell, M. D., State registrar, Helena.
*L. L. Benepe, deputy State registrar, Helena.
Division of water and sewage:
*H. B. Foote, director, Helena.
W. M. Cobleigh, consulting sanitary engineer, Bozeman.
*Ludwig Champa, analyst, Helena.
*C. W. Brinck, assistant sanitary engineer, Helena.
Hygienic laboratory:
*Fred D. Stimpert, director, Helena.
*Edith Kuhns, technician, Helena.
E. D. Hitchcock, M. D., consulting bacteriologist, Great Falls.
Appropriations for the years ending June 30:

	1936	1937
Salaries	$23,300	$35,000
Operating expenses	15,750	11,500
Capital repairs and replacements	500	300
Division of child welfare	10,500	9,000
Board of entomology (Rocky Mountain spotted-fever work)	3,000	500
Total	53,050	59,300

NEBRASKA DEPARTMENT OF HEALTH

Executive health officer:
*P. H. Bartholomew, M. D., acting director of health, Lincoln.
Collaborating epidemiologist:
*P. H. Bartholomew, M. D., Lincoln.
Bacteriologist:
*L. O. Vose, Lincoln.
Division of venereal diseases:
*P. H. Bartholomew, M. D., director, Lincoln.
Statistician:
*Jean Barrett, Lincoln.
Medical examining board:
W. R. Boyer, M. D., Pawnee City.
H. J. Lehnhoff, M. D., Lincoln.
P. A. DeOgny, M. D., Milford.
Appropriations for biennial period ending June 30, 1937:

Salary of director	$6,400
Salaries	20,000
Maintenance	10,000
Special	40,000
Total	76,400

NEVADA STATE BOARD OF HEALTH

State board of health:
Richard Kirman, Sr., Governor, president, Carson City.
John E. Worden, M. D., secretary and State health officer, Carson City.
W. G. Greathouse, secretary of state.
John Fuller, M. D., Reno.
C. W. West, M. D., Reno.
Executive health officer:
*John E. Worden, M. D., State health officer, Carson City.
State hygienic laboratory at State university:
*Vera E. Young, acting director, Reno.
Appropriations for period from July 1, 1935, to June 30, 1937:

Salary of secretary	$5,000
Salary of clerk	3,600
Traveling expenses	1,000
Office supplies, heat, rent, and light	1,550
Record books for county registrars	300
Equipment	200
Registration of births and deaths	350
Purchase of diphtheria and other dangerous disease antitoxin	500
Total	12,500

Publications issued by health department:
Biennial report.
Special bulletins.

NEW HAMPSHIRE STATE BOARD OF HEALTH

Board of health:
George C. Wilkins, M. D., Manchester.
Barbara Beattie, M. D., Littleton.
H. Styles Bridges, Governor, Concord.
Thomas P. Cheney, attorney general, Laconia.
James W. Jameson, M. D., Concord.
Robert B. Kerr, M. D., Manchester.
Executive health officer:
*Charles Duncan, M. D., secretary, State board of health, Concord.
Division of maternity, infancy, and child hygiene:
*Mary D. Davis, R. N., director and supervising nurse, Manchester.
Department of vital statistics:
*Charles Duncan, M. D., registrar, Concord.
Division of chemistry and sanitation:
*Charles D. Howard, chief of division, Concord.
*Frederick Vintinner, assistant chemist, Concord.
*Harriet I. Albee, assistant chemist and bacteriologist, Concord.
*Leonard W. Trager, assistant sanitary engineer, Concord.
*Russell A. Eckloff, inspector.
*Joseph X. Duval, chief inspector, Concord.
Diagnostic and pathological department:
*William R. Macleod, serologist and diagnostic bacteriologist, Concord.
H. N. Kingsford, M. D., pathologist, Hanover.
*Benjamin Jewell, assistant in pathological laboratory, Concord.
Venereal-disease division:
*Charles A. Weaver, M. D., Manchester.
Appropriations for fiscal year ending June 30, 1937:

State board of health	$52,260
Laboratory of hygiene	18,160
Vital statistics	4,430
Total	74,850

Publications issued by health department:
Bulletin.
Biennial report.

NEW JERSEY DEPARTMENT OF HEALTH

Board of health:
Irvin E. Deibert, M. D., president, Camden.
Mrs. Helen M. Berry, vice president, Newark.
Margaret L. MacNaughton, Jersey City.
Joseph N. Fowler, Bivalve.
E. W. Smillie, V. M. D., Plainsboro.
J. E. H. Guthrie, D. D. S., Newark.
Clyde Potts, C. E., Morristown.

Board of Health—Continued.
James E. Russell, Trenton.
Stanley H. Nichols, M. D., Asbury Park.
Augustus L. L. Baker, M. D., Dover.
Executive health officer:
*J. Lynn Mahaffey, M. D., director of health, Trenton.
Bureau of bacteriology:
*John V. Mulcahy, chief, Trenton.
Bureau of chemistry:
*John E. Bacon, chief, Trenton.
Bureau of administration:
*Charles J. Merrell, chief, Trenton.
Bureau of food and drugs:
*Walter W. Scofield, chief, Trenton.
Bureau of child hygiene:
Julius Levy, M. D., consultant, Trenton.
Bureau of local health administration:
*Wm. H. MacDonald, chief, Trenton.
Bureau of engineering:
*H. P. Croft, chief, Trenton.
Bureau of vital statistics:
*David S. South, chief, Trenton.
Bureau of venereal-disease control:
A. J. Casselman, M. D., consultant, Trenton.
Appropriations for fiscal year ending June 30, 1937:

Salaries	$228,985.00
Miscellaneous	64,218.00
Child hygiene	97,875.16
Venereal-disease control	25,420.00
Other special appropriations	65,985.00
Total	482,483.16

Publications issued by health department:
Monthly bulletin.
Annual report.

NEW MEXICO BUREAU OF PUBLIC HEALTH

Board of public welfare:
W. W. Nichols, president, Clovis.
Mrs David Chavez, vice president, Santa Fe.
Hugh M. Milton, II, secretary, State College.
Mrs. C. C. Meacham, Albuquerque.
L. C. White, Raton.
Executive health officer:
*J. Rosslyn Earp, Dr. P. H., director of public health, Santa Fe.
Division of sanitary engineering and sanitation:
*Paul S. Fox, M. S. in C. E., chief, Santa Fe.
Division of county health work:
*C. H. Douthirt, M. D., director, Santa Fe.
Division of epidemiology:
*L. A. Dewey, M. D., C. P. H., Santa Fe.
Division of maternal and child health:
*George S. Littell, M. D., Santa Fe.
State Supervisor of Public Health Nursing:
*Miss Mary Emma Smith, R. N., Santa Fe.
Public-health laboratory:
*Myrtle Greenfield, chief, Albuquerque.
State registrar:
*Miss Billy Tober, Santa Fe.
Appropriation for years 1935–36 and 1936–37, per annum, $43,500. Fiscal year ends June 30.

NEW YORK STATE DEPARTMENT OF HEALTH

Public-health council:
Simon Flexner, M. D., LL. D., chairman, New York.
Homer Folks, LL. D., vice chairman, Yonkers.
Livingston Farrand, M. D., LL. D., Ithaca.
Walter A. Leonard, M. D., Cambridge.
Henry N. Ogden, C. E., Ithaca.
Herman G. Weiskotten, M. D., Syracuse.
George Baehr, M. D., New York.
Clayton W. Greene, M. D., Buffalo.
Edward S. Godfrey, Jr., M. D. (ex officio), commissioner of health, Albany.
Executive health officer:
*Edward S. Godfrey, Jr., M. D., State commissioner of health, Albany.
Deputy commissioner of health:
*Paul B. Brooks, M. D., Albany.
Assistant commissioner for local health administration:

Assistant commissioner for preventable diseases:
*George H. Ramsey, M. D., Albany.
General superintendent of tuberculosis hospitals:
*Robert E. Plunkett, M. D.
Administrative officer:
*Edmund Schreiner, LL. B., Albany.
Administrative finance officer:
*Clifford C. Shoro, Albany.
Division of public-health education:
*B. R. Rickards, director, Albany.
Division of sanitation:
*Charles A. Holmquist, C. E., director, Albany.
Division of vital statistics:
*Joseph V. de Porte, Ph. D., director, Albany.
Division of maternity, infancy, and child hygiene:
*Elizabeth M. Gardiner, M. D., director, Albany.
Division of communicable diseases:

Division of tuberculosis:
*William Siegal, M. D., director, Albany.
Division of social hygiene:

Division of laboratories and research:
*August B. Wadsworth, M. D., director, Albany.
Division of public-health nursing:
*Marion W. Sheahan, R. N., director, Albany.
Division of orthopedics:
*Walter J. Craig, M. D., director, Albany.
Division of cancer control:
*Burton T. Simpson, M. D., director.
State institute for the study of malignant diseases, Buffalo:
*Burton T. Simpson, director.
New York State Hospital for Incipient Pulmonary Tuberculosis, Ray Brook:
*H. A. Bray, M. D., superintendent.
New York State Reconstruction Home, West Haverstraw:
*John B. Kelly, superintendent.
Homer Folks Tuberculosis Hospital, Oneonta.
*Ralph Horton, M. D., superintendent.
New York State Tuberculosis Hospital, Mount Morris:
*N. Stanley Lincoln, M. D., superintendent.
Appropriations for fiscal year ending June 30, 1937:

Personal service	$2,161,970.00
Maintenance and operation	1,644,895.00
State aid to county laboratories	138,000.00
State aid to county health activities	560,845.45
Construction and permanent betterments	926,198.00
Total	5,431,908.45

Other sources of revenue:
Fees from certified transcripts of birth, death, and marriage certificates, $3,113.84 per annum.
Marriage license applications, $32,164.50.
Licensing laboratories, $524.00.
Sale of serums, $4,048,86.
Licensing of embalmers and undertakers, $6,206.00.
Registration of embalmers and undertakers, $26,690.00.
Rental of radium, $52.14.
Miscellaneous receipts, $1,234.86.
Care of county cases at reconstruction home, $115,867.23.
Refund of transportation of discharged patients from tuberculosis hospitals, Ray Brook, $1,501.87.
Care of county patients at Homer Folks Tuberculosis Hospital, Oneonta, $7,044.47.
Publications issued by health department:
Weekly Health News.
Monthly Vital Statistics Review.
Annual Report.

NORTH CAROLINA STATE BOARD OF HEALTH

Board of health:
S. D. Craig, M. D., president, Winston-Salem.
J. N. Johnson, D. D. S., vice president, Goldsboro.

Board of health—Continued.
G. G. Dixon, M. D., Ayden.
H. Lee Large, M. D., Rocky Mount.
H. G. Baity, Chapel Hill.
W. T. Rainey, M. D., Fayetteville.
Hubert B. Haywood, M. D., Raleigh.
James P. Stowe, Ph. G., Charlotte.
John LaBruce Ward, M. D., Asheville.
Executive health officer:
*Carl V. Reynolds, M. D., secretary-treasurer and State health officer, Raleigh.
Division of preventive medicine:
*G. M. Cooper, M. D., director, and assistant State health officer, Raleigh.
(a) Maternity and infancy.
(b) Health education.
(c) School health supervision.
(d) Crippled children.
Division of oral hygiene:
*Ernest A. Branch, D. D. S., director, Raleigh.
Division of sanitary engineering:
*Warren H. Booker, C. E., director, Raleigh.
Division of laboratories:
John H. Hamilton, M. D., director, Raleigh.
Division of epidemiology:
*J. C. Knox, M. D., M. P. H., director, Raleigh.
Division of county health work:
*R. E. Fox, M. D., M. P. H., director, Raleigh.
Division of vital statistics:
*R. T. Stimpson, M. D., director, Raleigh.
Division of industrial hygiene:
*H. F. Easom, M. D., director, Raleigh.
Appropriation for fiscal year ending June 30, 1937, $323,200.
Other sources of revenue: Special fees, $52,610.

NORTH DAKOTA DEPARTMENT OF PUBLIC HEALTH

Advisory health council:
John Crawford, M. D., New Rockford.
Agnes Stucke, M. D., Garrison.
C. D. Durseuia, D. D. S., Bismarck.
P. O. Sathre, attorney general, ex officio, Bismarck.
Arthur E. Thompson, superintendent of public instruction, ex officio, Bismarck.
Maysil M. Williams, M. D., C. P. H., State health officer.
Executive health officer:
*Maysil M. Williams, M. D., C. P. H., State health officer, Bismarck.
Bureau of child hygiene and public health nursing:
*August C. Orr, M. D., director.
Bureau of venereal diseases:
——— ———
Bureau of vital statistics:
*Miss Margaret Lang.
Bureau of sanitary engineering:
*M. D. Hollis.
Appropriations for biennial period ending June 30, 1937:

Salary, State health officer	$4,800
Salary, director of communicable and venereal diseases	4,800
Salary, sanitary engineer	4,800
Salary, director of vital statistics	2,640
Salary, director of child hygiene	----
Stenographers	4,320
Chief clerk and accountant	3,000
Clerks	4,000
Postage	1,500
Office supplies	1,000
Furniture and fixtures	1,000
Printing	3,000
Miscellaneous	500
Travel expense	4,350
Card indexing, filing, and binding birth, death, and marriage certificates	2,000

OHIO DEPARTMENT OF HEALTH

Public-health council:
Walter H. Hartung, M. D., chairman, Columbus.
F. E. Mahla, M. D., secretary, Columbus.
G. D. Lummis, M. D., Middletown.
H. G. Southard, M. D., Marysville.
W. I. Jones, D. D. S., Columbus.
——— ———
Executive health officer:
*Walter H. Hartung, M. D., director of health, Columbus.
Assistant director of health:
*F. E. Mahla, M. D.
Division of administration:
*F. E. Mahla, M. D., chief.
*C. A. Orrison, chief clerk.
Bureau of publicity:
*Paul Mason, chief.
Bureau of local health organization:
*R. W. DeCrow, M. D., chief.
Division of communicable diseases:
*Finley Van Orsdall, M. D., chief.
Bureau of tuberculosis:
*W. J. Smith, M. D., chief.
Bureau of prevention of blindness:
*W. P. Johnson, M. D., chief.
Division of sanitary engineering:
*F. H. Waring, B. S. in C. E. and S. E., chief.
Bureau of plumbing inspection:
R. T. Barrett, chief.
Division of vital statistics:
*Irva O. Plummer, chief.
Division of laboratories:
*Leo F. Ey, chief.
Division of hygiene:
*E. R. Hayhurst, Ph. D., M. D., chief.
Bureau of hospitals:
*Clara E. Roeder, R. N., chief.
Bureau of occupational diseases and industrial hygiene:
*E. R. Hayhurst, Ph. D., M. D., chief.
Bureau of child hygiene:
*A. L. Van Horn, M. D., chief.
Bureau of dental hygiene:
*Homer C. Brown, D. D. S., chief.
Division of public health nursing:
*S. Gertrude Bush, R. N., chief.
Appropriations for 12 months ending Dec. 31, 1936:

Personal services	$185,500.00
Maintenance	39,910.50
State aid for health districts	150,000.00
Total	375,410.50

Publications issued by health department:
Ohio Health News (monthly).

OKLAHOMA DEPARTMENT OF PUBLIC HEALTH

Executive health officer:
*Charles M. Pearce, M. D., State health commissioner, Oklahoma City.
Assistant State health commissioner:
*J. P. Folan, Oklahoma City.
Bureau of vital statistics:
*Alice L. Talbot, registrar.
Bureau of laboratories:
*Floyd Whipple, bacteriologist.
*Katherine Harris, assistant bacteriologist.
*Taylor Rogers, chemist.
Bureau of sanitary engineering:
*H. J. Darcey, B. S. in engineering, director.
Appropriations for fiscal years ending June 30, 1936 and 1937:

Administration:	
Commissioner	$4,800
Assistant commissioner	2,400
Chief clerk	1,800
Stenographer	1,800
Bookkeeper	2,000
Stenographer	1,500
Do	1,200
Bureau of public health education:	
Stenographer	1,500
Diagnostic laboratory:	
State chemist	3,000
Assistant chemist	2,400
Bacteriologist	3,000
Assistant bacteriologist	2,400
Record clerk	1,800
Sanitary inspection:	
Sanitary engineer	3,000
Inspectors (8 at $1,800 each)	14,400
Bureau of vital statistics:	
Registrar	2,400
Assistant registrar	1,800

Appropriations—Continued.
Bureau of vital statistics—Continued.

Statistical clerks (3 at $1,500 each)	$4,500
Payment of local registrars	30,000
Contractual services:	
Traveling	10,000
Communication	3,500
Gas and lights at laboratory	1,500
Printing, other than office supplies	2,500
Supplies:	
Medical supplies	25,000
Office supplies	750
Equipment:	
Office equipment	500
Bureau of epidemiology:	
Rural sanitation, clinics	30,000
Malarial control	7,500
Manufacture of typhoid and diphtheria toxoid	4,000
Total	170,950

OREGON STATE BOARD OF HEALTH

Board of health:
J. H. Rosenberg, M. D., president, Prineville.
Arthur W. Chance, D. D. S., M. D., vice president, Portland.
Robert L. Benson, M. D., Portland.
H. H. Foskett, M. D., Portland.
N. E. Irvine, M. D., Lebanon.
F. Floyd South, M. D., Portland.
Archie Van Cleve, M. D., Portland.
Frederick D. Stricker, M. D., secretary, Portland.
Executive health officer:
***Frederick D. Stricker, M. D., secretary and State health officer, Portland.**
Registrar of vital statistics:
*Frederick D. Stricker, M. D., Portland.
Division of public health nursing and child hygiene:
Olive M. Whitlock, R. N., Portland.
Director of laboratory:
*William Levin, D. P. H., Portland.
Divison of sanitary engineering:
Carl E. Green, sanitary engineer.
Appropriations for fiscal year ending December 31, 1936, $36,368.
Publications issued by health department:
Annual report.
Biennial report.
Pamphlets and posters.
Weekly letter.

PANAMA CANAL ZONE HEALTH DEPARTMENT

Executive health officer:
*Col. H. C. Pillsbury, Medical Corps, United States Army, chief health officer, Balboa Heights.
*D. P. Curry, M. D., assistant chief health officer, Balboa Heights.
*L. B. Bates, M. D., chief, board of health laboratory, Ancon.
*O. E. Denney, Surgeon, U. S. P. H. S., chief quarantine officer, Balboa Heights.
Appropriation for 1935–36, $1,546,000.

PENNSYLVANIA DEPARTMENT OF HEALTH

Advisory health board:
Edith MacBride-Dexter, M. D., chairman.
Moses Behrend, M. D., Philadelphia.
R. J. Behan, M. D., Pittsburgh.
E. S. Briggs, M. D., Warren.
Walter S. Brenholtz, M. D., Williamsport.
John A. Meehan, D. D. S., New Castle.
C. B. Auel, C. E., East Pittsburgh.
Sanitary water board:
Edith MacBride-Dexter, M. D., chairman.
James F. Bogardus, secretary of forests and waters.
O. M. Deibler, commissioner of fisheries.
Philip G. Platt, Wallingford.
Marion McKay, Pittsburgh.
Frank D. McCue, Oil City.
W. L. Stevenson, chief engineer and secretary.
Executive Bureau:
***Edith MacBride-Dexter, M. D., secretary of health, Harrisburg.**
*Paul A. Rothfuss, M. D., deputy secretary of health, Harrisburg.
*Clinton T. Williams, comptroller, Harrisburg.
Division of accounts:
*E. J. MacNamara, Harrisburg.
Division of Supplies:
*S. J. Purvis, Harrisburg.
Division of Laboratories:
*Louis Tuft, M. D., Philadelphia.
Division of public health education.
*Howard L. Katzander, Harrisburg.
Division of dental hygiene:
*Milton Waas, D. D. S., Harrisburg.
Institutions:
Mont Alto Sanatorium:
*C. C. Custer, M. D., medical director, South Mountain.
Cresson Sanatorium:
*Louis A. Wesner, M. D., medical director, Cresson.
Hamburg Sanatorium:
*H. A. Gorman, M. D., medical director, Hamburg.
State Hospital for Crippled Children:
*John S. Donaldson, M. D., chief surgeon, Elizabethtown.
*Mrs. Hazel Smith, superintendent, Elizabethtown.
Bureau of health law enforcement:
*Paul A. Rothfuss, M. D.
Division of school inspection:
*Tod Rosenberg, Harrisburg.
Pre-school division:
*Richard R. Dalrymple, M. D., Harrisburg.
Division of drug control:
*Michael V. McFadden, Harrisburg.
Division of restaurant hygiene:
*Robert W. Shelton, Harrisburg.
Division of inspection and prevention:
*Horace Krone, Harrisburg.
Bureau of health conservation:
*J. Moore Campbell, M. D., Harrisburg.
Division of genito-urinary diseases:
*Edgar S. Everhart, M. D., Harrisburg.
Division of epidemiology:
*Henry Bley, M. D., Tamaqua.
Division of environmental hygiene:
*Edward Garner, Harrisburg.
*Robert Glenn, Harrisburg.
Bureau of nursing:
*Alice M. L'Halloran, R. N., Harrisburg.
Bureau of milk sanitation:
*Wilbur K. Moffett, Harrisburg.
Bureau of sanitary engineering:
*W. L. Stevenson, Harrisburg.
Bureau of vital statistics:
*Frank P. Strome, M. D., Harrisburg.
Appropriation for biennial period ending May 31, 1937:

Salary of secretary	$20,000
General health purposes and maintenance of sanatoria and hospital for crippled children	4,880,000
Total	4,900,000

PUBLIC HEALTH AND WELFARE SERVICE OF THE PHILIPPINES

(Under the Department of Public Instruction)

Commissioner of health and welfare:
***Jose Fabella, M. D., Manila.**

PUERTO RICO DEPARTMENT OF HEALTH

Insular board of health:
R. López Sicardó, M. D., chairman, San Juan.
W. A. Glines, M. D., San Juan.
E. Koppisch, M. D., San Juan.
Blas C. Herrero, M. D.
H. Cook, expert chemist.
Etienne Totti, civil and sanitary engineer, San Juan.
A. Rivera, veterinarian.
Manuel del Valle, D. D. S.

Insular board of health—Continued.
A. Ortiz Toro, attorney, San Juan.
H. A. Bladuell, M. D., secretary.
Executive health officer:
*E. Garrido Morales, M. D., Dr. P. H., commissioner of health, San Juan.
*Antonio Arbona, M. D., assistant commissioner of health, section of public health, San Juan.
*Pedro Malaret, M. D., assistant commissioner of health, section of charities, San Juan.
*George C. Payne, M. D., advisor, public health administration.
Division of property and accounts:
*Rafael Méndez, chief, San Juan.
Bureau of general sanitation:
*W. F. Lippitt, M. D., chief, San Juan.
Bureau of sanitary engineering:
*Octavio Marcano, C. E., S. E., San Juan.
Biological laboratory:
*Oscar Costa Mandry, M. D., director, San Juan.
Chemical laboratory:
*R. del Valle Sárraga, Ph. C., director, San Juan.
Bureau of epidemiology and vital statistics:
*Abel de Juan, M. D., chief, San Juan.
S. Riera López, M. D., C. P. H., epidemiologist, San Juan.
J. Basora Defilló, M. D., C. P. H., epidemiologist, San Juan.
*J. Rodriguez Pastor, M. D., tuberculosis specialist, San Juan.
Bureau of malaria:
*Walter C. Earle, M. D., advisor malaria control.
Bureau of infant hygiene:
*María Robert de Romeu, M. D., chief, San Juan.
Bureau of public health units:
José Chaves, M. D., chief, San Juan.
Division of social service:
*Beatriz Lassalle, superintendent, San Juan.
Appropriations for the fiscal year 1936–37:

Office of the commissioner	$128,817.92
Bureau of general sanitary inspection	53,345.00
Bureau of sanitary engineering	25,385.00
Biological laboratories	46,357.50
Chemical laboratory	19,810.00
Bureau of epidemiology and vital statistics	150,227.75
Bureau of malaria	45,783.00
Bureau of infant hygiene	12,896.75
Bureau of public health units	384,564.75
Section of charities	747,405.95
Total	1,620,593.62

RHODE ISLAND DEPARTMENT OF PUBLIC HEALTH

Executive health officer:
*Edward A. McLaughlin, M. D., director of public health and State registrar, State Office Building, Providence.
Division of laboratories:
*Edgar J. Staff, chief.
Division of sanitary engineering and chemistry:
*Charles L. Pool, chief.
Division of child hygiene:
*Marion A. Gleason, M. D., chief.
Division of communicable diseases and rural hygiene:
*Morris L. Grover, M. D., M. P. H., chief.
Division of vital statistics:
*Edward A. McLaughlin, M. D., director.
Division of social hygiene:
*Daniel L. Morrissey, M. D., chief.
Division of food and drugs and sanitary inspection:
*Henry J. McLaughlin, special agent.
Division of examiners:
*Robert D. Wholey, chief.
Division of narcotic drugs and pharmacies:
*A. Norman LaSalle, chief.
Division of athletics:
*Charles F. Reynolds, chief.
Division of purification of waters:
*Walter J. Shea, chief.
Appropriations for fiscal year ending June 30, 1937:

Administrative (including preventable diseases and child hygiene)	$74,925.00
Laboratory division:	
Pathological	$21,925.00
Chemical	16,915.00
Vital statistics	7,900.00
Sanitary inspection	26,320.00
Narcotic drugs and pharmacies	8,750.00
Purification of waters	10,030.00
Food and drugs	5,595.00
Athletics	7,900.00
Examiners	8,950.00

Other sources of revenue:
Registration fees.—Chiropody, $3; chiropractic, $3; optometry, $3; dentistry, $1; funeral directors, $10; embalmers, $5; hairdressers, $2; dental hygienists, $1; barbers, $2; nurses, $0.50; midwives, $0.50.
Licenses for swimming pools: licenses issued for quarters:
For the entire year, $20; for any quarter thereof, $5.
Licenses for camps and bathing beaches, $10 per year.
Fees for certified copies of births, marriages, and deaths, each, $0.50.
Publications:
Annual health report.
Annual registration report.
Weekly and monthly morbidity report.
Monthly mortality report.
Monthly health bulletin.

SOUTH CAROLINA STATE BOARD OF HEALTH

Executive committee:
F. M. Routh, M. D., chairman, Columbia.
K. M. Lynch, M. D., Charleston.
W. R. Mead, M. D., Florence.
E. A. Hines, M. D., Seneca.
W. R. Wallace, M. D., Chester.
L. D. Boone, M. D., Aiken.
George W. Dick, D. D. S., Sumter.
D. Lesesne Smith, M. D., Spartanburg.
J. Lee Carpenter, Ph. G., Greenville.
John M. Daniel, attorney general, Columbia.
A. J. Beattie, comptroller general, Columbia.
Executive health officer:
*James A. Hayne, M. D., State health officer, Columbia.
Bureau of rural sanitation and county health work:
*Ben. F. Wyman, M. D., director, Columbia.
Hygienic laboratory:
*H. M. Smith, M. D., director, Columbia.
Bureau of vital statistics:
*Martin Woodward, M. D., director, Columbia.
Appropriations, July 1, 1936, to June 30, 1937:

Superintendence and control of health	$1,270
Superintendence and accounts	19,937
Bureau of rural sanitation and county health work	76,580
Bureau of vital statistics	8,860
Hygienic laboratory	11,738
Distribution of biologics	34,000
Total	152,885

SOUTH DAKOTA STATE BOARD OF HEALTH

Board of health:
H. J. Bartron, M. D., president, Watertown.
N. T. Owen, M. D., vice president, Rapid City.
R. J. Quinn, M. D., Burke.
Carl A. Feige, M. D., Canova.
Park B. Jenkins, M. D., superintendent, Pierre.
Executive health officer:
*Park B. Jenkins, M. D., superintendent, Pierre.
*B. A. Dyar, M. D., assistant health officer, Pierre.
*G. J. Van Heuvelen, epidemiologist, Pierre.
Division of vital statistics:
*Park B. Jenkins, M. D., Pierre.
Division of child hygiene:
*Viola Russell, M. D., Pierre.
Division of sanitary engineering:
*W. W. Towne, C. E., Pierre.
*John Wiley, C. E., assistant sanitary engineer, Pierre.
*Richard Poston, assistant sanitary engineer, Pierre.

Division of medical licensure:
*Park B. Jenkins, M. D., Pierre.
Division of records and accounts:
*Katherine Niebuhr, Pierre.
Laboratories (at Vermillion):
J. C. Ohlmacher, M. D., Vermillion.
Appropriations:

	1935-36	1936-37
Salaries and wages	$10,000	$10,000
Biological products	2,000	2,000
Postage, communication, and travel	3,000	3,000
Crippled children	2,500	2,500
Dues	50	50
Infancy and maternity work	5,000	5,000
Office supplies, printing, and binding	2,500	2,500
Fund to be used in matching Federal funds	10,000	10,000
Total	35,050	35,050

TENNESSEE DEPARTMENT OF PUBLIC HEALTH

Central administration:
*W. C. Williams, M. D., C. P. H., commissioner, Nashville.
Local health service:
*R. H. Hutcheson, M. D., C. P. H., director, Nashville.
Maternal and child hygiene:
*John M. Saunders, M. D., C. P. H., acting director, Nashville.
Public health nursing:
*Miss Frances Hagar, R. N., associate director, Nashville.
Division of vital statistics:
R. H. White, Ph. D., director, Nashville.
Division of preventable diseases:
*Crit Pharris, M. D., C. P. H., director, Nashville.
Division of laboratories:
*W. H. Gaub, C. P. H., director, Nashville.
Division of sanitary engineering:
*Roy J. Morton, C. E., director, Nashville.
State appropriation for biennium July 1, 1935, to June 30, 1937, $509,558-$254,779 per annum.
Other sources of revenue:
Rockefeller Foundation International Health Division, $26,375 for year ending June 30, 1937.
Commonwealth Fund, $25,824 for year ending June 30, 1937.

TEXAS STATE DEPARTMENT OF HEALTH

State board of health:
E. W. Wright, M. D., chairman, Bowie.
W. P. Harrison, M. D., vice chairman, Teague.
Geo. W. Cox, M. D., Del Rio.
Henry F. Hein, Phar. D., San Antonio.
J. M. Howe, Houston.
Hubert Jackson, D. D. S., San Antonio.
J. S. McCelvey, M. D., Temple.
C. M. Rossor, M. D., Dallas.
S. A. Woodward, M. D., Fort Worth.
Executive health officer:
*John W. Brown, M. D., C. P. H., State health officer, Austin.
Local health service and child hygiene:
*H. N. Barnett, M. D., director.
Vital statistics:
*W. A. Davis, M. D., registrar.
State laboratory:
*S. W. Bohls, M. D., director.
Epidemiology:
*Chas. D. Reece, M. D., epidemiologist.
Maternal and child health:
Edythe P. Hershey, M. D., director.
Child hygiene:
J. W. E. H. Beck, field director.
County health unit:
*Don C. Peterson, M. D., C. P. H., field director.
Industrial hygiene:
Carl A. Nau, M. D., director.
Tuberculosis control:
Arthur Burns, M. D., director.
Venereal disease control and mental hygiene:
O. F. Gerodetti, M. D.
Malaria investigation:
C. P. Coogle, M. D., malariologist.
Dental health:
Edward Taylor, D. D. S., director.
Bureau of sanitary engineering:
*V. M. Ehlers, C. E., director.
Bureau of food and drugs:
*E. O. Keeth, Ph. G., director.
Public health education:
Harry Benge Crozier, director.
Chief clerk and accountant:
G. N. Holton.
Administrative assistant:
E. D. Hopkins.
Appropriations for fiscal years 1936 and 1937, $206,072.50 per annum.

UTAH STATE BOARD OF HEALTH

Board of health:
Joseph R. Morrell, M. D., president, Ogden.
J. L. Jones, M. D., secretary, Salt Lake City.
T. B. Beatty, M. D., Salt Lake City.
E. A. Tripp, D. D. S., Salt Lake City.
T. J. Howells, M. D., Salt Lake City.
R. A. Hart, C. E., Salt Lake City.
Barnet E. Bonar, M. D., Salt Lake City.
Executive health officer:
*J. L. Jones, M. D., Dr. P. H., State health commissioner, Salt Lake City.
Division of vital statistics:
*J. L. Jones, M. D., Dr. P. H., State registrar, Salt Lake City.
Division of sanitary engineering:
*Lynn M. Thatcher, director, Salt Lake City.
Bacteriological laboratory:
*E. H. Bramhall, director, Salt Lake City.
Division of epidemiology and local health administration:
*Samuel G. Paul, M. D., director, Salt Lake City.
Division of maternal and child health:
*Mildred Nelson, M. D., director, Salt Lake City.
Division of public health nursing:
*Lily Hagerman, R. N., State advisory nurse, Salt Lake City.
Division of crippled children's service:
*Marcella McInnerny, R. N., director, Salt Lake City.
County and district health units:
*Sumner Gleason, M. D., director, Davis county, Kaysville.
*Welby W. Bigelow, M. D., health officer, district no. 1, Salt Lake City.
*Alton A. Jenkins, M. D., health officer, district no. 2, Salt Lake City.
*Edw. L. Van Aelstyn, M. D., health officer, district no. 3, Salt Lake City.
Appropriations for fiscal year ending June 30, 1937, $98,180.

VERMONT DEPARTMENT OF PUBLIC HEALTH

State board of health:
William G. Ricker, M. D., chairman, St. Johnsbury.
Charles G. Abell, M. D., Enosburg Falls.
Claude M. Campbell, M. D., Manchester Center.
Executive health officer:
*Charles F. Dalton, M. D., secretary, State board of health, Burlington.
Laboratory of hygiene:
*Charles F. Whitney, M. D., Burlington.
Sanitary engineering:
Earl L. Waterman, C. E., director, Burlington.
Sanitary inspector:
*Fred S. Kent, M. D., Burlington.
Division of communicable diseases:
*Fred S. Kent, M. D., Burlington.
Division of tuberculosis:
*Harold W. Slocum, Burlington.
Division of poliomyelitis after-care:
*Miss Lillian E. Kron, R. N., Burlington.
Division of public health nursing:
*Miss Nellie M. Jones, R. N.

Appropriations for fiscal year ending June 30, 1936, $56,000; 1937, $56,000.
Other sources of revenue: Private donations for study and treatment of infantile paralysis.
Publications issued by the department of public health:
Biennial report.
Modern Health Crusader.

VIRGIN ISLANDS DEPARTMENT OF HEALTH

Executive health officer:
*Knud Knud-Hansen, M. D., commissioner of public health, St. Thomas.

VIRGINIA DEPARTMENT OF HEALTH

Board of health:
W. T. Graham, M. D., president, Richmond.
Mrs. Franklin H. Kenworthy, Purcellville.
Frank Darling, Hampton.
W. R. Williams, M. D., Richlands.
George B. Lawson, M. D., Roanoke.
Guy R. Harrison, D. D. S., Richmond.
L. T. Royster, M. D., University.
Executive health officer:
*I. C. Riggin, M. D., State health commissioner, Richmond.
Assistant health officer:
*Roy K. Flannagan, M. D., Richmond.
Director of rural health work and tuberculosis outpatient service:
*E. L. McQuade, M. D., D. P. H., Richmond.
Epidemiologist:
*G. F. McGinnes, M. D., Richmond.
Director of child health:
*B. B. Bagby, M. D., Richmond.
Registrar of vital statistics:
*W. A. Plecker, M. D., Richmond.
Director of public-health nursing:
*Mary I. Mastin, R. N., Richmond.
Director of mouth hygiene:
*N. T. Ballou, D. D. S., Richmond.
Acting director of laboratories:
*Adah Corpening, Richmond.
Chief sanitary engineer:
*Richard Messer, C. E., Richmond.
Appropriations for the year July 1, 1936, to June 30, 1937:

Administration	$22,675
Sanitary engineering	19,220
Shellfish sanitation	15,000
Publicity	8,950
Town and camp sanitation	4,075
Social hygiene	1,545
Prevention of tuberculosis	45,000
Control of epidemics	16,875
Laboratories	19,200
Promotion of child health and public health nursing	44,100
Rural health	113,475
Vital statistics (including marriage and divorce statistics and prevention of blindness)	38,890
Tuberculosis sanatoria	322,920
State aid to local tuberculosis sanatoria	34,000
Orthopedic treatment	36,250
Total	742,175

Publications issued by health department:
Monthly bulletin.
Annual report.

WASHINGTON STATE DEPARTMENT OF HEALTH

Board of health:
E. R. Coffey, M. D., director of health, chairman, Seattle.
Ralph Hendricks, M. D., Spokane.
Alexander Peacock, M. D., Seattle.
H. E. Wight, D. D. S., Yakima.
E. N. Hutchinson, D. V. M., Olympia.
Francis D. Rhoads, secretary, Seattle.
Department of health:
Office of the director:
*E. R. Coffey, M. D., director, Seattle.
*Donald G. Evans, M. D., assistant director, Seattle.

Department of health—Continued
Office of the director—Continued
*Anna R. Moore, R. N., advisory public health nurse, Seattle.
*A. S. Baker, M. D., health education advisor, Seattle.
Division of laboratories and epidemiology:
*A. U. Simpson, M. D., epidemiologist, Seattle.
Division of public health engineering:
*Roy M. Harris, C. E., public health engineer, Seattle.
Division of maternal and child hygiene:
*John D. Fuller, M. D., Seattle.
Division of vital statistics:
*Francis D. Rhoads, State registrar, Seattle.
Appropriation for 2 years ending March 31, 1937:

From general fund:	
Salaries and wages	$75,000
Operations	40,000
From fisheries fund:	
For industrial pollution studies	8,500
For oyster sanitation studies	5,500
From emergency fund:	
Mattress inspection	9,500
District office:	
Grand Coulee dam	13,000
Total	151,500

WEST VIRGINIA DEPARTMENT OF HEALTH

Public health council:
A. H. Hoge M. D., president, Bluefield.
S. W. Price, M. D., Scarbro.
B. H. Swint, M. D., Charleston.
W. C. D. McCuskey, M. D., Wheeling.
Walter E. Vest, M. D., Huntington.
M. T. Morrison, M. D., Sutton.
W. E. Minghini, D. D. S., Martinsburg.
Arthur E. McClue, M. D., secretary and commissioner of health, Charleston.
Executive health officer:
*Arthur E. McClue, M. D., commissioner of health, Charleston.
Division of sanitary engineering:
*Ellis S. Tisdale, chief engineer, Charleston.
*John B. Harrington, B. E., assistant engineer, Charleston.
*A. J. Kranaskas, C. E., assistant engineer, Charleston.
Bureau of industrial hygiene:
*Otto J. Swisher, M. D., director, Charleston.
*Richard T. Page, engineer, Charleston.
*S. C. Rothman, engineer, Charleston.
Division of vital statistics:
*Franklin H. Reeder, M. D., director, Charleston.
Division of child hygiene:
*Thomas H. Blake, M. D., director, Charleston.
*J. W. Fish, M. D., assistant director, Charleston.
*Laurene C. Fisher, R. N., State advisory nurse, Charleston.
Division of preventable diseases:
*Arthur E. McClue, M. D., acting director, Charleston.
Division of venereal diseases:
*Mrs. Virginia Dye Virgin, associate director, Charleston.
Division of rural sanitation:
*John F. Cadden, M. D., director, Charleston.
Hygienic laboratory:
*Miss Katherine Cox, director, Charleston.
*J. Roy Monroe, technician, Charleston.
*Margaret K. Riffe, technician, Charleston.
*Mark C. Harp, technician, Charleston.
*D. D. Johnson, technician, Charleston.
*M. T. Fowler, technician, Charleston.
Bureau of public health education:
*Miss Dorothea Campbell, director, Charleston.
*Miss Mary Louise Jester, assistant director, Charleston.
Appropriation for fiscal year ending June 30, 1937:

For general use	$120,275
Transferred from barbers and beauticians funds	10,000
From compensation department	8,200

WISCONSIN STATE BOARD OF HEALTH

Board of health:
- H. H. Ainsworth, M. D., president, Birchwood.
- Joseph Dean, M. D., vice president, Madison.
- Mina B. Glasier, M. D., Bloomington.
- Stephen Cahana, M. D., Madison.
- G. Windesheim, M. D., Kenosha.
- J. J. Seelman, M. D., Milwaukee.
- C. A. Harper, M. D., State health officer, Madison.

Executive health officer:
- *C. A. Harper, M. D., State health officer, Madison

Assistant State health officer:

Supervisor of Public Health Service:
- *C. N. Neupert, M. D., Madison.

Deputy State health officers:
- *G. W. Henika, M. D., Madison.
- *Geo. E. Hoyt, M. D., Elkhorn.
- *V. A. Gudex, M. D., Fond du Lac.
- *R. L. Frisbie, M. D., Rhinelander.
- *F. P. Daly, M. D., Chippewa Falls.

District health officers:
- *E. H. Jorris, M. D., Mauston.
- *Allan Filek, M. D., Green Bay.
- *John W. Lowe, M. D., Ashland
- *Leo M. Morse, M. D., Neillsville.

Brueau of vital statistics:
- *C. A. Harper, M. D., State registrar, Madison.
- *L. W. Hutchcroft, chief statistician, Madison.
- *F. E. Kester, junior statistician, Madison.

Bureau of communicable diseases:
- *H. M. Guilford, M. D., director, Madison.
- *A. C. Edwards, M. D., senior epidemiologist, Madison.

Bureau of sanitary engineering:
- *L. F. Warrick, State sanitary engineer, Madison.
- *O. J. Muegge, assistant sanitary engineer, Madison.
- *E. J. Beatty, assistant sanitary engineer, Madison.
- *J. M. Holderby, assistant sanitary engineer, Madison.
- *E. J. Tully, assistant chemical engineer, Madison.
- *Roy F. Weston, assistant sanitary engineer, Madison.
- *Alfred Steffen, assistant sanitary engineer, Elkhorn.
- *Chester Obma, assistant sanitary engineer, Fond du Lac.
- *Reginald Price, assistant sanitary engineer, Mauston.
- *Gerry Halverson, assistant sanitary engineer, Neillsville.
- *Frank J. McKee, assistant sanitary engineer, Green Bay.
- *Alfred W. West, assistant sanitary engineer, Chippewa Falls.
- *Charles L. Senn, assistant sanitary engineer, Rhinelander.
- *Harold Kingsbury, assistant sanitary engineer, Ashland.

Bureau of education:
- *John Culnan, editor, Madison.
- *Emma L. Glenz, illustrator, Madison.

Bureau of child welfare:
- *Amy L. Hunter, M. D., chief, Madison.
- *Frances A. Cline, M. D., child health physician, Madison.
- *Elizabeth Taylor, M. D., child health physician, Madison.
- *Ruth B. Bennett, M. D., child health physician, Madison.
- *Anne B. Cremer, M. D., child health physician, Madison.
- *Charlotte, Fisk, M. D., child health physician, Madison.
- *Charlotte Morrison, M. D., child health physician, Madison.
- *Grace M. Connors, R. N., public health nurse, Wautoma.
- *Sadie Engesether, R. N., public health nurse, Frederic.
- *Ruby McKenzie, R. N., public health nurse, Madison.
- *Ruth B. Naset, R. N., instructor in maternity and child hygiene, Madison.

Bureau of child welfare—Continued
- *Katheryn Lynch, R. N., assistant instructor in maternity and child hygiene, Madison.
- *Christine Nielsen, R. N., assistant instructor in maternity and child hygiene, Madison.
- *Maud Tollefson, R. N., advisory public health nurse, Madison.

Bureau of public health nursing:
- *Cornelia van Kooy, R. N., supervisor, Madison.
- *Martha Jenny, R. N., advisory public health nurse, Madison.
- *Sophia Paulus, R. N., public health nurse, Madison.
- *Myrtle Sadenwasser, R. N., public health nurse, Elkhorn.
- *Alberta Anderson, R. N., public health nurse, Fond du Lac.
- *Mildred Knoebel, R. N., public health nurse, Mauston.
- *Lila J. Johnson, R. N., public health nurse, Neillsville.
- *Estelle Jung, R. N., public health nurse, Green Bay.
- *Anita Wiederaenders, R. N., public health nurse, Chippewa Falls.
- *Jessie MacDonald, R. N., public health nurse, Rhinelander.
- *Margaret Brunner, R. N., public health nurse, Ashland.
- *Teresa Gardner, R. N., public health nurse (Indian Service), Reserve.
- *Nellie McLaughlin, R. N., public health nurse (Indian Service), Ashland.
- *Irene Thompson, R. N., public health nurse (Indian Service), Wisconsin Rapids.

Bureau of nursing education:
- *Barbara A. Thompson, R. N., director, Madison.

Bureau of plumbing and domestic sanitary engineering:
- *Frank R. King, State domestic sanitary engineer, Madison.

Bureau of social hygiene:
- *H. M. Guilford, M. D., director, Madison.
- *Aimee Zillmer, lecturer, Madison.
- *D. M. Warner, lecturer, Madison.
- *Susan Mitchell, R. N., venereal clinic nurse, Madison.
- *Leona Ludwig, venereal clinic nurse, Janesville.
- *Irene Ryss, R. N., venereal clinic nurse, Oshkosh.
- *Margaret Gebhardt, R. N., venereal clinic nurse, La Crosse.
- *Pauline Carrington, R. N., venereal clinic nurse, Superior.
- *Doris Ruf, R. N., venereal clinic nurse, Racine.
- *Josephine Kotes, R. N., venereal clinic nurse, Milwaukee.
- Paul C. Gatterdam, M. D., venereal clinic physician, La Crosse.
- Charles W. Giesen, M. D., venereal clinic physician, Superior.
- C. H. Sutherland, M. D., venereal clinic physician, Janesville.
- F. H. Frey, M. D., venereal clinic physician, Wausau.
- O. G. Richards, M. D., venereal clinic physician, Kenosha.
- Joseph Dean, M. D., venereal clinic physician, Madison.
- Earl F. Cummings, M. D., venereal clinic physician, Oshkosh.

Laboratory service:
- *W. D. Stovall, M. D., director, State laboratories, Madison.
- *M. S. Nichols, chemist, State laboratory, Madison.
- *Anna Brandsmark, director, branch laboratory, Rhinelander.
- *Mildred Englebert, director, cooperative laboratory, Beloit.
- *Marjorie Bates, director, cooperative laboratory, Oshkosh.
- *Henry Miller, director, cooperative laboratory, Kenosha.
- *Josephine Foote, director, cooperative laboratory, Wausau.

Laboratory service—Continued.
- *Martha Thompson, director, cooperative laboratory, Superior.
- *Clarissa McFetridge, director, cooperative laboratory, Green Bay.
- *Elizabeth Mathewson, director, cooperative laboratory, Sheboygan.

Appropriations for each of fiscal years ending June 30, 1936, and 1937:

General administration	$135,000
Licensing:	
95 percent of the receipts; estimated at:	
Embalmers	8,075
Hotels and restaurants	34,105
Barbers	22,515
Plumbers	20,235
Beauty parlors	25,600
Nurses	15,770
90 percent of the receipts; estimated at:	
Well drillers	3,825
To each county employing a county public health nurse, $1,000 per annum.	
Bureau of child welfare and public health nursing	43,350
Enforcement of medical practices act	2,500
Specific appropriations	180,850
Estimated appropriations	130,125

Publications issued by health department:
- Quarterly bulletin.
- Biennial report.
- Other bulletins on communicable diseases.

WYOMING DEPARTMENT OF PUBLIC HEALTH

Board of health:
- Earl Whedon, M. D., president, Sheridan.
- Evald Olson, M. D., vice president, Meeteetse.
- E. W. DeKay, M. D., Laramie.
- N. E. Morad, M. D., Casper.
- G. M. Anderson, M. D., secretary and executive officer, Cheyenne.

Executive health officer:
- *G. M. Anderson, M. D., State health officer Cheyenne.

Appropriations for biennial period ending March 31, 1937:

State board of health	$9,000
Salary of secretary	8,000
Maternal and infant welfare	5,000
Bureau of vital statistics	.
Total	25,580

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Oct. 10, 1936, and Oct. 12, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 10, 1936, and Oct. 12, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935
New England States:								
Maine	1	2	1	1	8	21	0	0
New Hampshire	1	2	2		2		0	0
Vermont		1				6	0	0
Massachusetts	8	2			53	24	0	1
Rhode Island	1				4	9	0	0
Connecticut	2	7		2	6	37	0	1
Middle Atlantic States:								
New York [1]	23	26	[2] 6	[2] 6	54	66	8	7
New Jersey	5	15	8	4	19	10	0	2
Pennsylvania	47	36			25	48	0	4
East North Central States:								
Ohio	20	39	2	40	10	35	2	2
Indiana	22	119	30	17	1	3	2	2
Illinois	35	67	7	13	8	9	2	6
Michigan	14	18		5	21	17	1	3
Wisconsin	5	3	20	34	18	33	1	1
West North Central States:								
Minnesota	1	12			8	13	0	6
Iowa	7	7		4	4	1	4	1
Missouri	10	57	111	34	8	14	0	1
North Dakota	2	2			2		0	0
South Dakota		1				1	0	1
Nebraska	1	7			1	1	0	0
Kansas	8	8				3	1	0
South Atlantic States:								
Delaware	1				4	9	0	1
Maryland [3]	8	9	5	2	4	2	2	6
District of Columbia	10	20			5	1	1	3
Virginia	41	72			8	3	3	1
West Virginia	17	68	7	15		11	2	0
North Carolina	122	78	3	4		2	1	0
South Carolina	23	13	96	166	4	1	1	0
Georgia [1]	28	30					0	0
Florida [1]	5	12	3	2	1	3	2	1
East South Central States:								
Kentucky	24	57	13	10	29	15	2	0
Tennessee	48	55	10	19	2		4	3
Alabama [1]	43	44	9	10		4	2	0
Mississippi	22	16					0	0

See footnotes at end of tables.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 10, 1936, and Oct. 12, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935
West South Central States:								
Arkansas	9	20	1	17	1		0	0
Louisiana [1]	15	14	14	3	2	3	1	0
Oklahoma [4]	10	11	10	32	1		3	4
Texas [1]	27	63	56	64	6	1	1	0
Mountain States:								
Montana		2	25	21		16	0	1
Idaho		1	3	4	2	8	0	0
Wyoming		3			1	13	0	0
Colorado	9	15			2	11	0	1
New Mexico	3	8	1	2	20	2	0	0
Arizona	1	1	12	31		1	0	1
Utah [4]					5	3	0	0
Pacific States:								
Washington					15	50	0	0
Oregon			15	13	5	95	1	0
California	22	47	17	20	17	123	2	1
Total	701	1,009	487	595	386	723	49	61
First 41 weeks of year	19,138	24,698	144,016	107,576	272,877	700,371	6,409	4,655

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935
New England States:								
Maine	0	13	18	15	0	0	2	0
New Hampshire	0	3	4	1	0	0	0	0
Vermont	0	6	7	6	0	0	0	1
Massachusetts	2	52	69	98	0	0	2	4
Rhode Island	0	13	17	9	0	0	1	0
Connecticut	1	18	19	24	0	0	1	1
Middle Atlantic States:								
New York [1]	9	71	185	219	0	0	46	12
New Jersey	2	24	18	46	0	0	5	7
Pennsylvania	7	1	174	152	0	0	47	27
East North Central States:								
Ohio	24	5	88	210	0	1	21	27
Indiana	10	4	75	101	0	0	8	11
Illinois	94	16	195	381	2	1	24	24
Michigan	18	29	150	90	2	0	14	7
Wisconsin	7	0	115	189	0	11	1	2
West North Central States:								
Minnesota	2	3	59	158	0	3	2	2
Iowa	5	2	56	49	0	10	6	11
Missouri	5	1	27	77	0	0	18	15
North Dakota	0	0	24	26	2	0	3	0
South Dakota	1	2	20	13	1	1	5	0
Nebraska	0	1	16	16	0	3	2	2
Kansas	6	2	56	61	0	1	6	4
South Atlantic States:								
Delaware	0	0	1	7	0	0	3	2
Maryland [3]	2	6	37	58	0	0	12	18
District of Columbia	1	4	7	11	0	0	2	3
Virginia	0	1	22	59	0	0	24	16
West Virginia	1	0	35	99	0	0	25	17
North Carolina	0	9	42	59	0	1	16	20
South Carolina	0	0	9	14	0	0	12	14
Georgia [1]	7	3	31	31	0	1	31	8
Florida [1]	1	0	11	1	0	0	1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 10, 1936, and Oct. 12, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935	Week ended Oct. 10, 1936	Week ended Oct. 12, 1935
East South Central States:								
Kentucky	4	11	24	104	0	0	43	34
Tennessee	15	1	28	106	0	0	10	24
Alabama [1]	9	1	17	16	0	0	16	3
Mississippi	4	2	11	23	0	0	10	6
West South Central States:								
Arkansas	1	0	3	16	0	0	6	8
Louisiana [1]	1	4	8	11	0	0	5	13
Oklahoma [4]	0	0	7	19	1	1	6	12
Texas [1]	1	2	19	37	0	0	25	21
Mountain States:								
Montana	4	0	24	39	11	0	1	5
Idaho	0	0	16	21	0	0	2	5
Wyoming	0	0	6	21	0	9	0	0
Colorado	1	1	14	59	0	0	6	9
New Mexico	2	0	8	9	0	0	20	12
Arizona	0	0	10	8	0	0	5	2
Utah [3]	0	1	11	36	0	0	0	1
Pacific States:								
Washington	4	0	43	33	4	5	8	8
Oregon	2	1	20	39	0	0	2	2
California	10	26	128	140	0	0	8	14
Total	263	339	1,990	3,017	23	48	513	435
First 41 weeks of year	3,112	9,201	193,670	194,715	6,313	5,565	11,438	14,509

[1] Typhus fever cases, week ended Oct. 10, 1936, 38 cases, as follows: New York, 1; Georgia, 22; Florida, 1, Alabama, 8; Louisiana, 1; Texas, 5.
[2] New York City only.
[3] Week ended earlier than Saturday.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1936										
Puerto Rico		59	78	967	233	1	8		0	73
September 1936										
Colorado	9	15			12		33	61	4	18
Connecticut	1	3	7	2	19		4	40	0	10
Dist. of Columbia	4	53	3		5		3	30		7
Maine	4	3	1	1	45		12	28	0	3
New Jersey	7	26	26	8	54		5	66	0	73
North Carolina	7	275	14		17	42	5	171	0	97
Wyoming		1			6		3	19	5	3

July 1936

Puerto Rico:	Cases
Chicken pox	3
Dysentery	125
Filariasis	2
Leprosy	1
Mumps	30
Ophthalmia neonatorum	3
Puerperal septicemia	8
Tetanus	9
Tetanus, infantile	1
Trachoma	1
Whooping cough	44

September 1936

	Cases
Chicken pox:	
Colorado	27
Connecticut	30
District of Columbia	4
Maine	38
New Jersey	67
North Carolina	27
Wyoming	1
Dysentery:	
Colorado	3
Connecticut (amoebic)	1
Connecticut (bacillary)	12
New Jersey	4
Epidemic encephalitis:	
Colorado	21
Connecticut	1
District of Columbia	1
Maine	1
New Jersey	1

September 1936—Continued

German measles:	Cases
Maine	2
New Jersey	33
North Carolina	4
Wyoming	1
Impetigo contagiosa:	
Colorado	12
Lead poisoning:	
Connecticut	1
Maine	1
Mumps:	
Colorado	24
Connecticut	85
Maine	103
New Jersey	114
Wyoming	11
Ophthalmia neonatorum:	
New Jersey	8
North Carolina	3
Paratyphoid fever:	
Connecticut	16
North Carolina	4
Rabies in animals:	
Connecticut	1
Maine	2
New Jersey	6
Rabies in man:	
North Carolina	1
Rocky Mountain spotted fever:	
North Carolina	5
Scabies:	
Colorado	10

September 1936—Continued

Septic sore throat:	Cases
Connecticut	4
North Carolina	18
Wyoming	2
Tetanus:	
Colorado	1
Connecticut	2
Maine	1
New Jersey	4
Trachoma:	
Colorado	1
Connecticut	1
Trichinosis:	
Connecticut	1
New Jersey	1
Tularemia:	
Wyoming	3
Typhus fever:	
North Carolina	4
Undulant fever:	
Connecticut	7
Maine	1
New Jersey	3
North Carolina	1
Vincent's infection:	
Maine	1
Whooping cough:	
Colorado	162
Connecticut	204
District of Columbia	123
Maine	78
New Jersey	366
North Carolina	87
Wyoming	

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 3, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	0	2	3	0	1	1	8	20
New Hampshire:											
Concord	0		0	0	0	0	0	0	0	0	4
Nashua	0			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	1	0	0	0	0	0	0	9
Rutland	0		0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	0		0	7	21	11	0	5	1	81	191
Fall River	0		0	0	2	7	0	1	0	0	31
Springfield	0		0	0	0	2	0	0	0	1	29
Worcester	2		0	3	0	1	0	1	0	8	47
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	15
Providence	0		0	0	1	10	0	2	0	9	47
Connecticut:											
Bridgeport	0		0	2	0	2	0	0	0	6	26
Hartford	0		0	0	0	5	0	0	0	8	32
New Haven	0		0	0	1	0	0	0	1	2	44
New York:											
Buffalo	2		0	2	2	2	0	4	0	7	126
New York	6	8	2	16	53	36	0	68	15	79	1,224
Rochester	0		0	1	2	2	0	0	0	2	55
Syracuse	0		0	2	2	5	0	1	0	17	35
New Jersey:											
Camden	1		0	0	2	2	0	2	0	5	34
Newark	0		0	1	2	0	0	8	0	33	83
Trenton	0		0	0	1	0	0	1	1	1	35
Pennsylvania:											
Philadelphia	1	2	2	0	29	17	0	24	0	71	397
Pittsburgh	8		1	0	16	15	0	5	0	29	147
Reading	0		0	0	0	1	0	0	0	3	17
Scranton	0			0		3	0		0	0	

City reports for week ended Oct. 3, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Ohio:											
Cincinnati	4	------	0	0	5	6	0	9	2	0	100
Cleveland	1	10	0	0	5	23	0	11	1	31	172
Columbus	3	------	0	0	4	4	0	5	6	8	83
Toledo	1	------	0	3	3	7	0	5	1	10	54
Indiana:											
Anderson	1	------	0	0	0	2	0	0	0	0	15
Fort Wayne	0	------	0	0	1	1	0	0	0	0	19
Indianapolis	3	------	0	1	9	4	0	2	0	5	102
Muncie	0	------	0	0	1	3	0	0	0	0	15
South Bend	0	------	0	0	0	0	0	0	0	2	12
Terre Haute	1	------	0	0	0	1	0	0	0	0	12
Illinois:											
Alton	1	------	0	0	1	0	0	0	0	1	14
Chicago	2	3	1	7	27	57	0	46	5	55	609
Elgin	0	------	0	0	1	1	0	0	0	2	8
Springfield	0	------	0	0	1	4	0	0	0	6	20
Michigan:											
Detroit	4	------	1	2	17	31	0	20	5	63	226
Flint	1	------	0	0	1	5	0	0	0	4	14
Grand Rapids	0	------	0	0	0	1	0	0	0	6	26
Wisconsin:											
Kenosha	0	------	0	0	0	5	0	0	0	0	7
Milwaukee	0	------	0	1	5	12	1	7	0	33	85
Racine	0	------	0	0	0	4	0	1	1	0	12
Superior	1	------	0	0	0	1	0	0	0	0	6
Minnesota:											
Duluth	0	------	0	1	0	3	0	1	0	4	14
Minneapolis	1	------	1	3	1	6	0	1	0	14	77
St. Paul	0	------	0	0	4	4	0	1	0	13	57
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	0	------
Davenport	0	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	------	0	------	5	0	------	3	0	34
Sioux City	0	------	------	0	------	4	0	------	0	1	------
Waterloo	1	------	------	0	------	3	0	------	0	6	------
Missouri:											
Kansas City	1	------	0	0	8	6	0	4	0	0	85
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	2	------	0	0	6	5	0	0	2	25	209
North Dakota:											
Fargo	0	------	0	0	0	1	0	0	0	0	7
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	1	0	0	0	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	3	0	0	0	0	14
Nebraska:											
Omaha	0	------	0	0	4	0	0	1	0	1	58
Kansas:											
Lawrence	0	------	0	0	2	0	0	0	0	0	11
Topeka	0	------	0	0	0	2	0	1	0	0	------
Wichita	0	------	0	0	2	3	1	1	0	0	24
Delaware:											
Wilmington	0	------	0	1	3	1	0	0	1	3	32
Maryland:											
Baltimore	4	2	1	0	12	7	0	17	0	110	174
Cumberland	0	------	0	0	0	0	0	0	0	0	12
Frederick	0	------	0	0	0	1	0	0	0	0	2
District of Columbia:											
Washington	11	------	0	0	12	8	0	19	5	15	174
Virginia:											
Lynchburg	0	------	0	0	1	0	0	0	0	0	9
Norfolk	2	------	0	0	2	0	0	1	0	0	32
Richmond	0	------	0	0	0	3	0	4	0	1	45
Roanoke	1	------	0	0	0	2	0	1	0	0	12
West Virginia:											
Charleston	0	------	0	0	1	0	0	0	0	0	18
Huntington	2	------	------	0	------	1	0	------	0	0	------
Wheeling	0	------	0	0	0	2	0	1	0	1	12
North Carolina:											
Gastonia	0	------	------	0	------	2	0	------	0	0	------
Raleigh	1	------	0	0	4	0	0	0	0	0	16
Wilmington	2	------	0	0	2	0	0	2	0	0	13
Winston-Salem	0	------	0	0	3	0	0	0	1	0	26

City reports for week ended Oct. 3, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
South Carolina:											
Charleston	0	4	0	0	1	0	0	0	1	0	17
Columbia	------	------	------	------	------	------	------	------	------	------	------
Greenville	1	------	0	0	1	0	0	1	0	0	15
Georgia:											
Atlanta	6	1	0	0	5	3	0	4	0	0	78
Brunswick	0	------	0	0	0	1	0	0	0	0	4
Savannah	1	1	1	0	0	0	0	1	2	2	24
Florida:											
Miami	0	------	0	0	0	1	0	2	0	0	29
Tampa	1	------	0	0	2	2	0	0	0	2	17
Kentucky:											
Ashland	0	------	0	0	4	0	0	1	0	0	32
Covington	0	------	0	0	1	1	0	0	0	0	16
Lexington	0	------	0	2	0	1	0	0	0	0	22
Tennessee:											
Knoxville	5	------	0	0	1	4	0	3	2	0	28
Memphis	0	------	0	0	2	0	0	5	0	0	89
Nashville	2	------	0	0	4	1	0	0	2	0	44
Alabama:											
Birmingham	1	------	0	0	0	2	0	4	1	0	51
Mobile	1	------	0	0	0	0	0	3	0	0	27
Montgomery	2	------	------	0	------	1	0	------	0	1	------
Arkansas:											
Fort Smith	1	------	------	0	------	0	0	------	0	0	------
Little Rock	0	------	0	0	2	1	0	7	0	0	11
Louisiana:											
Lake Charles	0	------	0	0	1	0	0	0	0	0	7
New Orleans	8	------	0	0	6	2	0	7	4	1	132
Shreveport	1	------	0	0	1	3	0	3	1	0	46
Oklahoma:											
Oklahoma City	1	8	0	0	3	2	0	1	0	0	35
Texas:											
Dallas	1	------	0	1	6	1	0	1	0	0	63
Fort Worth	2	------	0	1	2	0	0	2	0	12	35
Galveston	0	------	0	0	2	0	0	2	0	0	18
Houston	3	------	0	0	5	1	0	5	1	0	57
San Antonio	0	------	0	0	5	0	0	7	0	0	55
Montana:											
Billings	0	------	0	0	0	1	0	0	0	0	4
Great Falls	0	------	0	0	0	3	0	0	0	0	11
Helena	0	------	0	0	0	1	0	0	1	0	5
Missoula	0	------	0	0	0	1	0	0	0	1	6
Idaho:											
Boise	0	------	0	0	0	3	0	0	0	0	3
Colorado:											
Colorado Springs	0	------	0	0	4	1	0	3	0	0	16
Denver	1	------	1	3	3	11	0	5	1	36	99
Pueblo	0	------	0	0	1	0	0	0	1	1	7
New Mexico:											
Albuquerque	0	------	0	0	1	0	0	1	1	0	11
Utah:											
Salt Lake City	0	------	1	0	1	4	3	2	0	5	24
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	0	0	2	2	0	0	0	0	79
Spokane	0	------	0	0	2	12	2	0	0	2	29
Tacoma	0	------	0	0	0	1	0	0	0	2	31
Oregon:											
Portland	0	------	0	1	5	3	0	0	0	4	65
Salem	0	1	------	0	------	0	0	------	2	2	------
California:											
Los Angeles	9	17	0	8	19	11	0	21	1	50	312
Sacramento	0	------	0	0	2	14	0	2	2	8	37
San Francisco	1	------	0	1	10	8	0	4	0	22	144

City reports for for week ended Oct. 3, 1936—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	0	1
New York:			
New York	3	0	2
Syracuse	0	0	1
New Jersey:			
Newark	2	0	0
Pennsylvania:			
Philadelphia	2	0	2
Ohio:			
Cincinnati	1	0	3
Toledo	1	0	6
Illinois:			
Chicago	2	0	38
Elgin	1	0	1
Michigan:			
Detroit	1	0	10
Wisconsin:			
Milwaukee	0	0	1
Minnesota:			
Minneapolis	0	0	1
Iowa:			
Des Moines	0	0	1
Missouri:			
St. Louis	1	0	4
South Dakota:			
Sioux Falls	0	0	1
Kansas:			
Topeka	1	0	0
Maryland:			
Baltimore	4	1	1
District of Columbia:			
Washington	5	0	3
Virginia:			
Lynchburg	0	0	1
Tennessee:			
Knoxville	0	0	4
Nashville	0	0	2
Louisiana:			
Shreveport	0	2	0
Texas:			
Houston	0	2	0
Montana:			
Missoula	0	0	1
Utah:			
Salt Lake City	0	0	1
Washington:			
Spokane	0	0	1
Oregon:			
Portland	0	0	1
California:			
Los Angeles	0	0	3
San Francisco	0	0	2

Dengue.—Cases: Savannah, 2.
Epidemic encephalitis.—Cases: Omaha, 1; Wichita, 1; Washington, 1.
Pellagra.—Cases: Charleston, S. C., 2; Atlanta, 1; Savannah, 1; New Orleans, 2.
Typhus fever.—Cases: Norfolk, 1; Charleston, S. C., 1; Atlanta, 3; Savannah, 2; Tampa, 2; Mobile, 1; Dallas, 1.

FOREIGN AND INSULAR

BELGIUM

Vital statistics—1935.—The following table shows vital statistics for Belgium for 1935:

Population	8,299,940	Number of deaths	106,226
Number of live births	127,405	Death rate per 1,000 population	12.8
Birth rate per 1,000 population	15.35	Number of marriages	63,160
Number of stillbirths	4,182		

CANADA

Manitoba—Poliomyelitis.—During the week ended October 10, 1936, 56 new cases of poliomyelitis were reported in the Province of Manitoba, Canada, making a total of 345 cases reported in the province since June 20, 1936. Six cases of poliomyelitis were reported in Winnipeg during the week ended October 10, 1936.

Vital statistics—First quarter 1936.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the first quarter of 1936. The rates are computed on an annual basis. There were 19.7 live births per 1,000 population during the first quarter of 1936 and 20.1 per 1,000 population in the same quarter of 1935. The death rate was 10.2 per 1,000 population for the first quarter of 1936 and 10.7 per 1,000 population for the first quarter of 1935. The infant mortality rate for the first quarter of 1936 was 70 per 1,000 live births and 83 in the corresponding quarter of 1935. The maternal death rate was 6.2 per 1,000 live births for the first quarter of 1936 and 5.9 for the same quarter of 1935.

The accompanying tables give the numbers of births, deaths, and marriages by Provinces for the first quarter of 1936, and deaths from certain causes in Canada for the first quarter of 1936, and the corresponding quarter of 1935, and by Provinces for the first quarter of 1936.

Number of births, deaths, and marriages, first quarter 1936

Province	Live births	Deaths (exclusive of still-births)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	54,380	28,204	3,791	336	11,746
Prince Edward Island	464	301	38	3	82
Nova Scotia	2,624	1,477	201	11	697
New Brunswick	2,573	1,273	230	17	449
Quebec	18,999	8,306	1,581	127	2,710
Ontario	15,613	9,870	875	104	4,243
Manitoba	3,201	1,776	203	17	811
Saskatchewan	4,542	1,658	280	18	937
Alberta	3,871	1,652	263	26	961
British Columbia	2,493	1,891	120	13	856

[1] Exclusive of Yukon and the Northwest Territories.

Number of deaths, Canada, first quarter 1935 and 1936, and by Provinces, first quarter 1936

Cause of death	Canada [1] (first quarter)		Province, first quarter 1936								
	1935	1936	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	179	147	--------	5	8	25	70	7	1	10	21
Cancer	2,705	2,912	20	168	122	731	1,105	189	176	184	217
Diarrhea and enteritis	455	453	3	14	7	262	91	12	29	23	12
Diphtheria	57	64	--------	5	4	38	2	6	1	4	4
Diseases of the arteries	2,095	2,433	26	117	95	436	1,248	146	95	99	171
Diseases of the heart	4,490	4,413	46	212	154	1,045	1,924	249	252	206	325
Homicides	30	43	--------	1	4	4	13	5	6	3	7
Influenza	1,651	1,345	10	32	28	428	300	179	153	139	76
Measles	176	186	8	3	25	37	87	20	4	6	1
Nephritis	1,619	1,733	16	89	62	773	542	68	56	52	75
Pneumonia	2,553	2,353	42	137	131	627	856	154	128	146	132
Poliomyelitis	13	14	1	--------	--------	2	3	2	3	2	1
Puerperal causes	318	336	3	11	17	127	104	17	18	26	13
Scarlet fever	91	80	--------	2	--------	23	34	6	6	6	3
Smallpox	3	2	--------	--------	--------	--------	--------	--------	--------	1	1
Suicides	235	225	2	8	4	27	97	22	18	27	20
Tuberculosis	1,711	1,698	19	98	80	784	332	124	74	92	145
Typhoid fever	47	61	1	--------	8	35	8	6	4	3	1
Other violent deaths	1,041	891	5	51	81	174	351	55	46	66	112
Whooping cough	310	170	7	29	9	60	27	7	15	14	2

[1] Exclusive of Yukon and the Northwest Territories.

ITALY

Communicable diseases—4 weeks ended August 16, 1936.—During the 4 weeks ended August 16, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	July 20-26		July 27-Aug. 2		Aug. 3-9		Aug. 10-16	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	19	17	45	34	40	35	35	29
Cerebrospinal meningitis	13	12	17	8	12	12	11	10
Chicken pox	115	81	125	84	133	86	80	62
Diphtheria and croup	311	184	381	215	420	231	340	218
Dysentery	31	16	39	22	29	15	32	20
Hookworm disease	17	11	16	11	19	11	23	11
Lethargic encephalitis	--------	--------	2	2	1	1	2	2
Measles	1,068	275	889	257	657	198	461	161
Mumps	224	96	180	84	158	79	102	60
Paratyphoid fever	121	85	136	99	138	103	144	90
Poliomyelitis	108	83	70	53	78	50	61	47
Puerperal fever	17	16	23	22	28	23	29	28
Rabies	--------	--------	2	1	--------	--------	--------	--------
Scarlet fever	163	88	150	96	180	102	171	111
Typhoid fever	750	398	862	444	976	456	855	458
Undulant fever	86	68	67	48	68	51	47	34
Whooping cough	675	227	595	203	557	184	510	175

SCOTLAND

Vital statistics—1935.—Following are vital statistics for Scotland for the year 1935:

Number of marriages	37,097	Deaths per 1,000 population	13.19
Number of births	87,928	Infant mortality per 1,000 births	76.8
Births per 1,000 population	17.75	Maternal mortality per 1,000 births	6.3
Number of deaths	65,331		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 25, 1936, pages 1348–1361. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 30, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Afghanistan—Zurmat Province.—On October 8, 1936, cholera was reported present in Zurmat Province, Afghanistan.

Plague

Ecuador—Alausi.—During the period September 1–15, 1936, 1 case of plague with 1 death was reported in Alausi, Ecuador.

Egypt—Beheira Province.—One fatal case of plague was reported in Beheira Province, Egypt, on October 3, 1936.

Hawaii Territory—Hawaii Island—Hamakua District—Paauhau Sector.—A rat found October 8, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague infected.

Smallpox

Mexico.—During the month of July 1936, smallpox has been reported in Mexico as follows: Mexico, D. F., 12 cases, 1 death; Queretaro, Queretaro State, 1 case.

Typhus Fever

Mexico.—During the month of July 1936, typhus fever has been reported in Mexico as follows: Aguascalientes, Aguascalientes State, 1 death; Guadalajara, Jalisco State, 1 case; Mexico, D. F., 23 cases, 9 deaths; Mexico State, 3 cases, 2 deaths; San Luis Potosi, San Luis Potosi State, 3 cases, 1 death; Sinaloa State, 1 death.

Yellow Fever

Colombia.—During the week ended August 29, 1936, 1 death from yellow fever was reported in Colombia, the location not being specified.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 51 OCTOBER 30, 1936 NO. 44

MORTALITY FROM CERTAIN CAUSES DURING THE FIRST HALF OF 1936 [1]

This report presents mortality data for 21 States, the District of Columbia, and Hawaii for the first half of 1936, with comparative data for recent years. In addition to the death rate from all causes, rates are shown for 17 specific causes, 4 groups of causes, and for infant and maternal mortality.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of some lack of uniformity in the method of classifying deaths according to cause, some delayed death certificates, and various other reasons, these preliminary rates cannot be expected to agree in all instances with final rates published by the Bureau of the Census. The final figures are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve as a current index of mortality until final figures are available.

The populations used for 1934 and 1935 are the official estimates as published by the United States Bureau of the Census on May 11, 1936. These estimates are corrected to agree with the population of the United States as computed from births, deaths, immigration, and emigration since the 1930 census. Since no estimates have been prepared for States for 1936, the figures used are an extrapolation from the official 1935 estimates, with the same annual increment as that used by the Bureau of the Census for the year 1935 as compared with 1934. Populations for 1933 were estimated by making the increment for 1934 over 1933 the same as that used by the Census Bureau for 1935 as compared with 1934.

At the top of the table, rates are given for a group of 22 [2] States with an estimated population of 70,000,000 that have data available for the first 6 months of each of the 4 years 1933–36. For individual States, data are shown for the first 6 months or for as many of those months as are now available, with rates for corresponding periods of 2 preceding years. Comparisons made below refer only to the 22 States with complete data.

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

[2] See footnote to table for States included.

The death rate from all causes for the first half of 1936 was 11.9 per 1,000 (annual basis), as compared with 11.4, 11.5, and 11.1 in the first 6 months of 1935, 1934, and 1933, respectively. In 19 of the 22 States the rate was higher in the first half of 1936 than in the same half of 1935. In both the first and second quarters of 1936 the rates exceeded those for the corresponding periods in the 3 preceding years.

The relatively high mortality from all causes is largely accounted for by the increased mortality from influenza and pneumonia during the first half of 1936. Mortality from influenza and pneumonia was slightly higher in the first half of 1936 than in the same period of 1935 and 1933, and markedly higher than in 1934, a year of low influenza and pneumonia mortality. Rates for pneumonia were higher in both the first and second quarters of 1936 than they were in corresponding periods of the 3 years immediately preceding; 18 of the 22 States showed an increase over the first half of last year and 4 a decrease. Mortality from influenza was higher in the first half of 1936 than in either 1935 or 1934 for the same period; only 8 of the 22 States, however, reported higher rates than in the same period of 1935. During the first quarter of 1936 reported mortality from influenza was lower than last year, and during the second quarter it was higher than in any of the 3 preceding years. The minor epidemic of influenza [3] in the winter of 1935–36 was most severe in the southwestern section of the country and extended over a period of approximately 4 months, from January to April, inclusive.

Infant mortality in this period was the lowest it has been in recent years. Among 22 States with complete data, 19 had lower rates and 3 had higher rates in the first half of 1936 than in the same months of 1935.

The mortality rate from meningitis was definitely higher during the first 6 months of 1936 than during the corresponding period in each of the 3 preceding years; 15 of the 22 States had a higher rate than in 1935. The incidence of meningitis has stood at a relatively high level since the latter part of 1931. States showing the greatest increases in 1936 over 1935 in the death rate were those located in regions along the Atlantic coast and the South Central region. Scarlet fever was exceptionally high during 1935 and in the early part of 1936; the rate for the first 6 months of each year was 3.1 per 100,000 as compared with 2.8 for the corresponding period in the years 1934 and 1933.

Heart diseases, nephritis, cerebral hemorrhage, cancer, and diabetes showed increases over recent years. The rise was particularly significant in heart diseases, which showed an increase of about 9 percent

[3] See Gover, Mary. Influenza Mortality in the United States, 1936. Public Health Reports, Oct. 9, 1936, p. 1390.

over the 1935 rate, as compared with less than 1 percent in 1935 over 1934; the increase for this period in 1934 over 1933 was approximately 10 percent. The 1936 rise was quite general; 20 of the 22 States having a higher rate and only 2 showing a decrease. Nineteen States reported an increase in cerebral hemorrhage and diabetes and 14 an increase in cancer.

The death rates from measles and whooping cough were considerably below those for the 3 preceding years. In 1935 and 1934 both of these diseases were unusually prevalent. The typhoid rate (0.9 per 100,000) was the lowest for this period in the 4 years under review. The diarrhea and enteritis rate was also the lowest in recent years. Diphtheria continued to decline, with a rate of 1.7 per 100,000, as compared with 1.9 for the corresponding period in each of the 3 preceding years.

The steady decline of tuberculosis was uninterrupted; 17 of the States participated in the decline from the 1935 level and 5 showed an increase.

Mortality from certain causes in the first 6 months of 1936, with comparative data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	All except malformations and early infancy	Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (16)	Lethargic encephalitis (17)	Meningococcus meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (59)	Diseases of the nervous system (78-89)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the circulatory system (90-103)	Diseases of the heart (90-95)	Diseases of the respiratory system (104-114)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-120)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130-132)
22 STATES [1]																									
January to June—																									
1936	11.9	55	24	5.6	0.9	1.0	3.1	2.0	1.7	29.6	0.2	0.6	3.2	53.8	114.3	27.9	113.0	91.9	319.5	293.9	128.6	115.1	63.3	5.3	88.3
1935	11.4	58	26	5.8	1.0	5.5	3.1	4.4	1.9	28.0	.2	.7	2.7	55.0	112.0	25.3	108.3	86.2	293.0	267.6	119.4	[illegible]	65.3	6.0	85.4
1934	11.5	61	27	6.1	1.3	6.6	2.8	4.5	1.9	19.7	.4	.6	1.0	56.1	109.9	25.9	104.1	81.1	298.3	265.8	115.9	101.4	66.9	7.1	90.3
1933	11.1	60	27	6.1	1.4	2.6	2.8	2.7	1.9	37.6	.3	.7	1.4	59.1	105.6	24.8	105.3	81.1	272.3	239.2	99.1	86.3	65.0	7.2	87.8
January to March—																									
1936	12.6	58	27	5.8	.8	.9	3.5	2.0	2.2	36.6	.2	.6	3.4	53.8	113.8	30.3	119.3	97.2	338.5	311.7	157.5	142.9	62.2	4.9	92.6
1935	11.9	63	31	6.0	.9	4.6	3.2	3.9	2.4	43.9	.2	.6	2.3	51.7	109.6	27.0	111.3	89.7	303.4	279.8	141.4	127.2	63.1	4.3	88.0
1934	11.9	64	30	6.0	.9	5.7	3.3	4.1	2.5	27.1	.3	.6	1.0	55.5	107.9	27.3	108.8	84.5	316.0	281.1	137.0	121.6	63.9	5.8	94.2
1933	11.8	66	32	6.3	1.2	1.9	3.2	2.7	2.5	62.8	.3	.7	1.6	59.0	105.4	26.9	110.3	85.6	286.5	253.8	125.6	111.8	61.6	5.6	90.5
April to June—																									
1936	11.3	53	21	5.3	1.0	1.1	2.7	1.9	1.2	22.6	.1	.6	2.9	53.8	114.7	25.6	106.8	86.6	300.5	276.0	98.7	87.3	64.3	5.7	84.0
1935	10.9	54	22	5.5	1.2	6.1	3.0	5.0	1.4	14.0	.2	.7	2.9	55.1	114.4	23.6	105.3	82.9	278.9	255.3	97.7	83.8	67.4	7.6	82.8
1934	11.1	59	22	6.2	1.7	7.5	2.3	5.2	1.4	12.3	.4	.6	1.0	56.8	111.9	21.4	99.5	77.7	280.7	250.7	95.0	81.4	69.9	8.3	86.5
1933	10.4	54	27	5.8	1.6	3.2	2.5	2.7	1.3	12.1	.3	.7	1.2	59.2	105.9	22.7	100.2	76.7	256.2	224.7	72.9	61.0	69.1	9.1	85.1
JANUARY TO JUNE																									
Alabama:																									
1936	11.6	71	45	6.5	.8	1.2	.5	2.6	2.7	82.2	.4	.1	1.1	68.2	56.1	12.6	96.7	69.3	167.4	152.2	148.9	139.1	59.7	13.2	82.4
California: [2]																									
1936	14.6	51	23	5.1	.3	5.3	2.9	1.1	2.9	29.4	.3	.6	3.3	89.6	151.8	29.5	128.0	101.9	448.8	406.1	128.5	113.1	83.1	4.8	98.6
1935	13.8	54	25	5.1	1.1	.9	1.5	.6	2.3	18.5	.4	.3	2.1	82.1	147.9	30.5	126.4	94.9	423.6	376.5	111.2	97.6	84.3	4.4	96.4
1934	12.3	53	24	4.6	.9	3.0	1.7	3.4	2.0	10.8	.5	.7	1.3	93.8	136.9	26.0	117.8	90.0	381.7	335.2	105.6	91.3	70.8	6.5	92.9
Connecticut:																									
1936	10.9	47	[4]	4.9	.1	.7	.8	2.1	.2	13.4	.1	.3	1.3	40.6	128.7	32.0	[4]	[4]	[4]	247.1	[4]	99.6	[4]	2.9	96.4
1935	11.0	47	[4]	5.6	.7	3.4	2.0	1.3	.9	12.3	.2	.5	1.1	47.3	124.3	34.8	[4]	[4]	[4]	243.6	[4]	90.3	[4]	1.5	93.0
1934	10.7	55	[4]	5.6	.5	.2	.9	1.2	.4	9.9	[3]	.4	.7	45.6	118.9	27.9	[4]	[4]	[4]	234.3	[4]	86.4	[4]	3.8	92.5

District of Columbia:																									
1936	15.5	72	32	5.6	1.9	2.2	.6	5.4	6.4	12.8	.3	.6	14.4	112.7	134.2	33.0	146.3	109.5	413.1	365.4	193.4	174.8	76.5	5.8	101.2
1935	15.3	62	29	4.9	1.4	(3)	2.7	.3	3.7	18.0	(3)	1.4	20.0	113.7	129.0	28.5	128.7	101.2	408.4	359.2	188.8	171.4	91.0	9.2	108.6
1934	15.5	68	38	3.1	.4	17.3	1.8	10.4	1.1	9.7	.4	1.1	.7	115.2	131.8	33.5	133.6	100.8	433.2	381.0	164.6	115.1	85.7	9.0	119.2
Florida:																									
1936	13.3	64	33	8.2	2.4	.4	.1	1.7	2.8	79.4	.7	.5	3.3	54.1	87.9	21.7	133.9	108.9	279.2	257.7	121.5	105.3	83.5	8.2	110.1
1935	12.6	69	40	9.1	2.2	3.4	(3)	3.9	3.9	58.7	.6	(3)	.6	56.7	85.3	22.4	123.2	97.6	248.9	228.3	95.7	90.7	93.3	16.1	110.2
1934	12.8	70	37	8.0	3.1	9.5	.4	5.6	3.6	30.3	.5	.5	.1	61.7	81.1	17.0	129.9	98.4	254.2	234.8	103.9	90.0	94.1	14.2	124.1
Georgia:																									
1936	10.6	70	(4)	7.5	2.6	.2	.3	1.8	2.2	86.5	.3	.4	2.6	49.6	47.6	10.0	97.3	71.7	168.0	158.1	145.7	135.6	54.9	8.7	92.7
1935	9.9	75	(4)	8.0	3.3	1.3	.6	6.1	2.6	60.6	.6	.1	.8	50.8	46.2	10.8	94.6	65.5	151.8	142.3	112.2	103.5	67.3	14.3	93.2
1934	10.6	88	(4)	8.2	5.0	28.9	.4	10.7	3.7	39.3	.5	.2	.6	53.4	47.9	11.5	100.9	65.2	160.7	147.6	124.1	114.3	66.0	15.3	93.0
Hawaii:																									
1936	8.0	74	44	5.0	2.3	(3)	(3)	.9	1.8	15.2	(3)	.9	2.8	76.4	60.3	13.3	63.0	44.6	136.7	127.9	87.0	73.6	69.0	21.2	69.5
1935	8.1	68	42	5.4	2.4	(3)	(3)	3.3	(3)	7.6	(3)	(3)	1.1	75.4	63.6	15.2	61.2	46.5	120.0	111.5	83.0	72.1	68.8	24.2	70.7
1934	9.4	89	60	6.6	3.9	.5	(3)	16.5	1.0	20.9	.5	(3)	1.5	83.1	62.2	15.0	56.4	36.9	112.2	100.1	176.9	159.9	83.1	35.0	60.3
Idaho:																									
1936	10.9	47	17	3.5	1.2	2.5	15.3	1.7	.8	21.1	.4	.8	9.1	29.0	77.5	17.0	111.1	76.3	243.0	193.6	148.9	130.2	56.4	.4	28.6
1935	10.2	61	25	7.3	1.3	2.5	4.6	10.1	.4	23.6	.4	2.9	5.1	25.7	66.9	13.5	91.8	68.2	210.9	162.5	132.6	115.8	60.6	.8	29.0
1934	10.2	50	17	5.5	2.6	6.0	3.4	3.0	3.0	18.3	1.7	1.3	3.0	34.1	69.9	10.7	107.9	78.4	199.1	169.3	135.1	121.1	61.0	2.6	38.8
Illinois:																									
1936	12.2	51	20	4.6	.5	.2	4.9	2.3	2.8	19.7	.1	.4	3.0	54.0	131.2	30.9	108.1	84.4	356.2	331.6	114.1	100.5	67.7	3.8	109.2
1935	11.5	54	22	5.5	.7	7.3	7.8	3.4	2.8	24.9	.2	.6	3.7	51.8	126.7	25.5	100.0	75.3	310.5	288.6	109.3	98.2	69.7	3.6	101.6
1934	11.5	54	21	5.3	.9	4.3	5.0	3.4	1.5	13.2	.2	.5	2.1	54.9	124.4	30.1	103.4	74.3	303.0	285.4	102.2	91.1	70.9	4.7	110.5
Indiana:																									
1936	12.4	55	23	5.4	.8	.2	4.5	1.7	3.7	42.8	.1	.7	2.4	49.9	103.7	18.1	(4)	135.9	(4)	281.5	(4)	132.1	(4)	3.7	83.8
1935	11.5	59	26	5.8	.5	4.8	4.2	5.5	2.6	37.1	.1	.6	3.7	50.0	110.5	14.7	(4)	129.3	(4)	264.8	(4)	108.0	(4)	3.1	68.7
1934	12.0	57	25	6.3	1.8	11.2	4.3	5.3	2.7	26.1	.3	.4	.8	53.9	105.1	18.7	(4)	122.9	(4)	266.8	(4)	94.5	(4)	3.8	79.5
Iowa:[2]																									
1936	10.9	52	19	5.8	1.3	.3	6.2	2.1	1.9	28.6	(3)	(3)	3.5	22.9	124.1	29.4	147.2	120.2	299.1	267.2	123.6	113.2	57.9	2.7	74.5
1935	10.9	62	32	4.8	1.1	15.8	2.7	1.4	2.6	45.4	(3)	.5	1.4	28.5	120.0	28.6	132.2	107.1	266.0	240.1	127.4	115.2	57.3	2.9	60.3
1934	10.8	59	25	6.9	.3	1.0	2.4	2.9	1.6	38.9	(3)	.8	1.1	20.5	115.8	25.4	154.1	122.0	254.2	222.2	137.9	120.3	53.7	2.9	54.0
Kansas:																									
1936	12.6	56	25	6.9	1.2	.2	6.7	1.4	2.6	76.9	.3	1.2	1.8	33.5	114.1	23.6	141.4	115.3	294.5	263.5	151.3	120.9	68.0	4.1	108.9
1935	11.7	56	28	5.5	.4	23.1	2.6	3.6	2.1	51.4	.2	1.5	2.9	30.3	112.1	22.5	123.9	100.3	267.6	239.2	129.2	117.1	69.6	4.8	94.0
1934	10.7	50	20	6.3	.7	3.3	2.7	7.0	2.1	28.9	.1	1.4	1.5	29.4	108.3	26.2	121.3	96.4	245.1	217.2	85.8	75.9	73.1	4.2	100.8
Louisiana:																									
1936	12.7	87	51	11.2	4.5	3.8	.3	5.8	3.7	77.8	.4	.2	2.4	74.6	77.9	18.0	90.6	74.8	245.4	215.2	165.5	150.8	76.4	17.8	111.6
1935	11.2	77	42	7.7	7.4	10.2	.7	3.2	4.7	34.1	.7	.6	1.0	78.8	75.3	15.1	93.1	69.2	205.8	181.2	109.7	97.5	82.2	16.3	108.7
1934	10.7	78	49	9.8	8.3	11.4	1.1	12.3	4.8	27.4	.3	.2	.9	73.2	74.5	13.5	85.0	57.6	218.4	197.7	96.7	83.4	71.8	21.1	106.4
Maryland:																									
1936	13.9	63	32	4.8	1.0	2.4	1.0	4.0	1.8	15.4	(3)	1.0	11.8	82.7	129.3	29.8	143.6	119.2	353.9	326.3	157.0	143.5	58.0	4.2	155.4
1935	13.6	64	30	5.4	1.1	2.2	2.7	3.9	1.2	25.1	(3)	1.1	5.0	86.9	130.0	27.7	143.9	119.1	323.3	298.9	151.8	139.1	67.5	8.0	142.3
1934	13.3	69	32	6.0	1.7	16.1	2.3	9.5	1.2	11.3	.4	.8	.1	81.7	124.8	25.6	135.6	108.8	319.6	291.1	145.3	130.8	57.5	6.8	153.6

[1] States included are Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Kansas, Louisiana, Maryland, Michigan, Minnesota, Montana, Nebraska, New Jersey, New York, Pennsylvania, Rhode Island, South Dakota, Tennessee, Virginia, West Virginia, and Wisconsin (estimated population as of July 1, 1936, 70,188,000). Includes all of the States with available data for the 4 years covered by this summary. For a few causes, 1 to 3 States were omitted because of missing data.

[2] January to March only.

[3] No deaths.

[4] Data not available

Mortality from certain causes in the first 6 months of 1936, with comparative data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (16)	Lethargic encephalitis (17)	Meningococcus meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Diseases of the nervous system (78–89)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the circulatory system (90–103)	Diseases of the heart (90–95)	Diseases of the respiratory system (104–114)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–132)
JANUARY TO JUNE—con.																									
Michigan:																									
1936	12.1	54	24	5.2	.6	.3	3.2	2.5	.7	18.1	.3	.6	1.6	45.1	116.3	28.4	128.0	101.3	335.1	304.8	132.8	118.2	72.5	6.4	71.9
1935	11.7	56	22	5.4	.5	7.5	3.2	3.0	.9	23.9	(3)	.3	1.1	47.2	113.5	27.5	124.4	95.4	307.4	250.7	123.7	109.3	70.3	4.4	65.6
1934	11.6	57	22	5.8	.9	1.1	6.2	3.7	1.1	18.0	.3	.2	.7	50.1	110.4	25.7	129.8	99.3	302.7	275.1	116.0	109.9	73.3	5.4	70.2
Minnesota:																									
1936	10.8	45	18	4.7	.5	1.6	7.4	1.0	.3	18.1	.2	.6	2.6	37.7	129.0	27.3	115.5	84.6	269.2	250.7	113.4	100.7	60.7	4.0	49.8
1935	10.4	50	20	5.6	.2	4.1	4.8	3.4	.5	24.3	.1	1.0	2.1	36.9	130.2	23.5	107.9	85.6	243.2	219.2	103.9	97.8	64.9	3.1	50.1
1934	10.6	49	18	5.9	.5	2.5	1.5	4.5	1.0	20.4	.3	1.4	1.0	39.2	129.8	24.0	107.4	84.5	252.0	227.2	110.5	93.2	69.4	2.7	56.0
Mississippi:																									
1936	12.2	(4)	(4)	(4)	2.9	2.1	.2	2.5	1.8	111.6	.4	.2	1.5	61.0	59.7	11.6	93.5	75.0	157.4	140.9	112.0	101.6	66.1	15.4	103.4
1935	10.3	(4)	(4)	(4)	2.5	1.6	.4	6.7	3.2	62.7	.4	.2	1.2	53.3	57.7	10.8	78.5	64.1	125.4	109.3	72.8	67.3	62.8	15.1	95.0
1934	10.8	(4)	(4)	(4)	2.1	27.6	.3	18.6	2.7	34.9	.8	.8	.3	61.7	52.2	8.3	84.2	74.0	122.1	104.8	87.9	85.0	63.3	20.5	79.3
Montana:																									
1936	12.1	51	(4)	5.3	1.1	(4)	12.1	4.2	3.0	29.9	(3)	(3)	4.2	44.7	100.0	34.2	121.9	91.3	212.5	193.4	168.5	149.2	81.8	6.4	76.5
1935	12.2	63	(4)	5.2	1.9	17.5	3.0	6.1	3.4	60.0	.4	1.1	3.0	46.0	101.8	18.6	110.5	84.7	228.2	211.2	172.0	156.8	105.6	6.5	80.1
1934	11.0	49	(4)	6.5	1.6	2.8	3.6	3.6	2.0	40.4	(3)	1.2	1.6	52.4	94.7	21.6	107.9	81.6	206.7	188.7	114.7	98.3	86.0	6.8	77.2
Nebraska:																									
1936	10.6	46	19	6.8	.7	1.5	8.4	1.8	1.6	27.1	.3	.6	1.8	19.0	112.2	27.7	122.8	94.7	206.0	247.1	103.1	89.0	81.4	3.4	77.5
1935	10.3	47	24	5.8	.6	11.5	3.5	1.2	1.5	35.9	.3	.6	4.3	22.8	102.5	20.6	135.5	105.9	217.0	198.8	130.5	114.4	68.3	3.0	50.6
1934	10.0	48	18	6.2	.4	2.4	1.8	8.7	1.2	22.2	.4	.6	1.2	25.3	114.0	21.1	127.4	101.4	210.7	190.0	103.0	94.2	71.4	3.1	60.6
New Jersey:																									
1936	10.7	49	(4)	4.1	.5	.4	1.6	1.3	.5	11.3	.3	.8	2.4	51.6	122.5	32.3	101.4	85.0	338.0	315.6	99.5	88.7	56.0	3.3	82.4
1935	10.6	51	(4)	4.8	.5	2.4	1.1	2.8	1.2	14.7	.3	.6	.8	52.2	118.8	29.9	100.0	80.4	324.0	302.0	90.7	80.8	55.9	3.3	86.1
1934	10.9	53	(4)	5.2	.4	2.0	2.4	1.6	1.4	8.1	.2	.9	.3	56.0	120.6	28.9	106.7	87.3	330.4	308.7	97.2	85.6	59.9	5.1	90.4
New York:																									
1936	12.7	50	19	5.6	.6	1.8	2.3	1.0	.4	9.5	(3)	.7	3.0	61.5	146.1	38.1	108.7	85.0	403.7	375.8	129.6	117.9	69.0	5.2	84.9
1935	12.4	54	23	5.7	.4	2.5	2.3	3.0	1.0	10.6	.2	.6	2.7	61.4	143.9	35.1	103.6	80.5	378.3	344.3	122.1	110.8	69.6	6.7	88.1
1934	12.6	58	25	6.0	.4	1.0	2.1	1.5	1.2	9.2	.5	.6	.8	63.7	139.9	34.3	78.2	53.5	407.5	349.5	128.1	115.5	73.2	7.3	93.0

North Carolina:																									
1936	11.0	65	(4)	6.7	1.0	.2	.7	.9	3.0	53.2	.4	.6	1.9	62.0	52.5	12.6	(4)	(4)	(4)	(4)	(4)	142.7	(4)	9.8	(4)
1935	10.6	72	(4)	6.9	1.1	3.9	.6	12.4	3.1	48.3	1.4	.4	1.1	60.8	50.0	10.4	(4)	(4)	(4)	(4)	(4)	118.3	(4)	16.4	(4)
1934	11.0	83	(4)	7.5	.7	16.4	1.6	13.6	4.4	30.5	.4	.3	.7	67.1	51.1	11.2	(4)	(4)	(4)	(4)	(4)	134.0	(4)	16.8	(4)
Pennsylvania:																									
1936	11.8	52	23	4.7	.5	.5	2.2	1.2	1.5	20.8	.1	.5	1.8	46.6	111.5	31.0	114.7	92.2	339.0	316.7	117.9	103.0	54.7	5.5	90.4
1935	11.4	58	29	5.4	.6	4.2	2.7	2.4	1.7	28.3	.2	.9	1.4	48.2	106.9	28.7	112.7	86.0	315.4	291.8	121.0	105.8	55.1	5.1	90.9
1934	11.7	62	32	6.5	.8	4.8	3.4	3.7	2.4	20.6	.2	.6	.7	51.2	104.1	30.2	112.8	87.7	317.0	285.0	121.4	106.2	60.2	6.9	98.9
Rhode Island:																									
1936	12.6	52	18	4.5	(3)	.6	2.7	.9	.3	15.1	(3)	.6	5.0	50.8	135.0	36.9	122.3	102.5	389.8	362.9	129.0	122.5	62.3	4.4	107.2
1935	12.4	55	20	2.9	.3	1.8	.6	1.5	.6	13.0	.3	.3	4.1	55.1	144.5	38.8	123.8	101.9	392.7	367.2	113.7	103.6	68.4	6.2	106.3
1934	12.5	60	23	6.1	.9	(3)	.9	4.4	(3)	11.5	.3	.3	.6	47.7	141.5	31.3	128.8	103.9	367.5	342.0	116.7	104.2	64.0	4.7	124.4
South Carolina:																									
1936	9.8	85	(4)	8.9	2.8	.6	.5	2.7	1.6	69.3	.7	.1	2.7	46.9	38.9	9.1	97.5	85.5	175.6	161.7	134.5	124.1	23.7	3.7	79.6
1935	10.0	91	(4)	10.6	5.3	1.6	.2	10.0	1.3	64.2	.7	.9	1.6	46.4	39.8	9.7	97.9	87.0	178.5	167.0	101.6	95.4	29.2	7.1	81.6
1934	10.3	104	(4)	11.1	3.3	15.5	.4	16.3	2.7	48.0	.6	2.1	.6	50.2	41.7	11.0	(4)	(4)	181.5	(4)	(4)	107.4	29.9	(4)	97.1
South Dakota:																									
1936	9.5	49	22	4.8	1.5	.3	6.3	.9	1.2	21.5	(3)	.3	(3)	35.8	89.1	25.3	109.6	85.5	185.3	170.4	105.5	90.0	54.2	7.4	70.0
1935	10.2	59	31	7.7	1.2	8.4	2.4	5.1	1.2	51.7	1.2	.6	.3	43.9	92.3	21.5	112.6	83.4	168.5	147.9	153.9	136.2	54.7	5.4	65.7
1934	10.1	64	30	5.5	.9	30.9	2.4	9.8	.9	36.3	.6	.3	-----	36.9	88.9	24.4	110.9	83.9	174.0	152.0	116.3	105.3	63.4	6.8	63.4
Tennessee:																									
1936	11.3	68	42	7.4	1.8	1.2	1.0	2.5	2.8	84.7	.3	1.0	5.2	88.8	59.5	13.1	101.5	79.1	176.6	162.5	166.7	154.5	60.5	7.3	65.7
1935	10.0	69	42	7.7	2.6	2.2	.5	21.2	3.6	57.9	.6	.6	4.6	84.6	61.2	11.2	96.2	75.3	148.3	135.1	132.2	112.4	62.0	11.0	59.0
1934	10.2	68	42	6.6	2.8	28.2	1.4	7.8	2.9	44.6	.9	1.0	1.3	83.2	58.5	10.9	94.3	74.9	151.9	140.5	122.5	102.3	68.7	14.0	60.0
Virginia:																									
1936	12.1	64	(4)	5.5	1.5	1.4	.6	3.8	3.0	58.3	.3	.4	7.5	70.2	70.8	17.4	128.5	101.6	264.1	214.1	134.4	123.1	46.8	3.7	98.9
1935	11.7	71	(4)	5.8	1.1	9.7	1.1	11.1	3.2	58.5	.4	.5	4.9	74.3	70.5	16.1	123.7	98.0	248.6	229.6	115.0	104.8	50.9	7.2	90.2
1934	11.5	72	(4)	7.0	1.9	9.3	1.3	7.1	3.6	35.9	.5	.7	1.5	76.2	68.9	18.2	119.8	94.2	242.5	225.5	108.2	96.0	51.0	8.8	91.9
Washington:																									
1936	12.2	46	17	4.6	.4	3.7	2.4	.9	.2	39.3	.6	2.3	1.8	52.4	128.7	26.2	137.9	110.1	322.0	291.1	99.3	90.5	65.9	1.2	80.7
1935	11.6	45	15	5.8	.4	2.1	1.7	2.7	1.1	23.8	.9	2.0	2.5	52.1	132.5	24.1	123.6	101.4	309.0	281.4	71.7	61.4	65.6	2.2	83.8
1934	10.8	(4)	(4)	(4)	1.7	1.4	1.1	3.6	.6	14.2	.9	2.0	1.4	48.9	128.2	20.8	116.6	91.0	290.2	257.8	71.2	61.4	56.7	1.6	74.5
West Virginia:																									
1936	10.8	65	31	7.2	1.8	2.2	1.8	3.5	5.2	45.0	.8	.5	7.0	56.7	67.4	15.2	102.5	81.4	204.2	185.6	136.7	127.6	52.7	4.5	75.1
1935	10.1	65	32	6.4	3.1	11.8	4.9	11.1	5.8	44.0	.3	.6	4.3	61.3	70.6	12.0	92.6	71.4	160.0	144.0	117.2	107.9	58.7	5.9	69.8
1934	9.6	69	30	6.3	1.8	3.4	3.8	10.5	4.5	35.8	.6	.4	1.8	53.9	63.9	10.5	102.0	81.7	145.9	125.1	109.4	98.3	46.7	7.7	64.9
Wisconsin:																									
1936	11.5	51	20	4.5	.5	.5	6.8	1.9	.4	19.5	(3)	.6	1.5	37.0	133.9	28.8	(4)	103.8	(4)	297.6	(4)	90.8	(4)	1.6	73.1
1935	10.8	54	21	4.1	.1	4.0	5.4	1.6	.5	30.7	.1	1.1	1.7	38.7	128.1	25.7	(4)	91.7	(4)	255.3	(4)	50.4	(4)	4.9	73.6
1934	10.9	56	22	4.3	.3	3.8	1.8	4.4	1.0	16.4	.3	.3	.6	41.5	126.3	25.5	(4)	91.8	(4)	251.9	(4)	90.4	(4)	5.2	73.9

[3] No deaths.
[4] Data not available.

THE SELENIUM PROBLEM IN RELATION TO PUBLIC HEALTH

A Preliminary Survey to Determine the Possibility of Selenium Intoxication in the Rural Population Living on Seleniferous Soil [1]

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INTRODUCTION

For many years there has been known to the farmers of the Great Plains of the North Central region of the United States a chronic disease in livestock commonly and erroneously referred to as "alkali" disease. The first scientific report of it appears to have been written in 1856 by Dr. T. C. Madison, who, as an Army surgeon while stationed at Fort Randall, now part of Gregory County, S. Dak., observed this condition in many cavalry horses. Madison also correctly suggested a toxic factor in the local forage as a probable cause of the disease His suggestion seems to have been forgotten, however, for until relatively recent times the disease has been commonly associated with high-mineral content in the drinking water generally prevalent in those localities where the disease has been known to occur, hence the term "alkali" disease.

The chief characteristics of this disease as it manifests itself in horses, cattle, and hogs are loss of hair, especially from the mane and tail of horses, loss of weight and emaciation, and varying degrees of involvement of the hoofs Excellent descriptions of the gross and microscopic pathology may be found in papers by Franke et al. (*2*) and Draize and Beath (*3*).

The true nature of so-called "alkali" disease did not become generally known until Franke (*4*) demonstrated the toxic character of some of the grains grown in sections of South Dakota where the disease in livestock has been more or less prevalent. Following this, Robinson (*5*) was able to demonstrate the presence of selenium in the grain which had been previously found to be toxic to animals. The work of Hurd-Karrer (*6*) furthermore demonstrated the ability of plants to assimilate selenium from the soil, and a survey by Byers (*7*) showed the wide though spotty distribution of selenium in the shale soils and in the grain and vegetation grown in several of the States of the North Central Great Plains.

This succession of events has thus led not only to a better understanding of the etiology of the so-called "alkali" disease in livestock, but it has also served to focus attention upon the possibility that the public health might be involved, since selenium-bearing grain and vegetation grown upon seleniferous soil may also enter into the human

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[1] From the Division of Pharmacology, National Institute of Health, Washington, D. C.

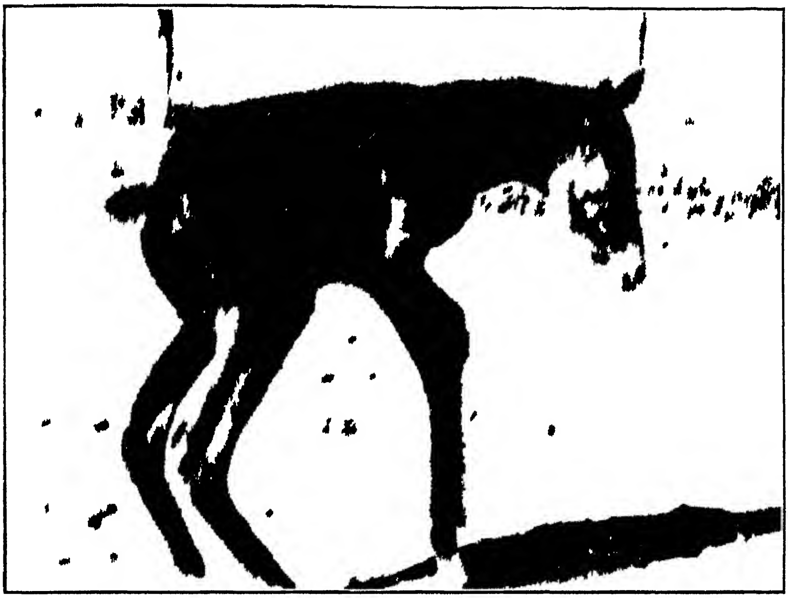

FIGURE 1

FIGURE 2

Congenital alkali disease in a 14-day-old colt born of a mare that became alkalied during gestation. Note condition of hoofs and joints. A golden yellow semigelatinous effusion filled the joints of the extremities and infiltrated adjoining tissues. A similar effusion was found in the pleura and pericardium. The liver and kidneys contained 300 and 1[illegible] micrograms of selenium respectively per 100 grams

dietary. It is this phase of the selenium problem with which the present report is concerned.

SCOPE AND CHARACTER OF THE INVESTIGATION

At the outset it seemed probable that, if selenium is ingested in any appreciable amount anywhere, it would be most pronounced in the rural populations subsisting largely on the products of relatively restricted soil areas. A survey was therefore instituted to cover a selected moderately large group of the farming population in three of the Great Plains States, South Dakota, Wyoming, and Nebraska. The choice of locations was determined by three factors: First, use was made of the geologic information available concerning the distribution of Cretaceous shale deposits in the soil, since, according to recent investigations, there appears to be a high incidence of selenium in such shale soils (*7, 8*). Second, use was made of the published chemical data by Byers (*7*) on the incidence and distribution of selenium in the soil and some of the vegetation in the aforementioned States. The third and the most important determining factor in this investigation was the incidence of so-called "alkali" disease in livestock. A present or past history of this disease on a given farm was considered presumptive evidence of the occurrence of selenium in the food products grown there. With very few exceptions, therefore, the material and information included in this report were secured only upon those farms and ranches where a reliable history of "alkali" disease could be obtained. Knowledge of the occurrence of the condition is frequently denied upon direct questioning, for reasons that are not difficult to see, and it has often been necessary to resort to lengthy indirect questioning before full confidence and cooperation could be secured.

As evidence of selenium ingestion by the human population and of possible harmful effects therefrom, careful note and inquiry were made concerning the health conditions of the members of families visited. Information was obtained regarding the dietary habits of the family groups to ascertain to what extent the foodstuffs produced locally actually entered into their dietary. Wherever possible, general physical examination was made in an attempt to discover one or more symptoms that might be considered sufficiently characteristic of selenium intoxication to be of probable aid in diagnosis. In this the supposed toxicological similarity of selenium to arsenic was always borne in mind, and the typical symptomatology of "alkali" disease was used as a guide. Finally, in suitable cases samples of urine were secured for chemical analysis for selenium in the belief that, if found, it would not only furnish direct proof of the ingestion of this element but might also be helpful in appraising the value of the clinical observations and findings.

The entire survey extended over a period of about 6 weeks, from the latter part of April to early June. With few exceptions little or no home-grown garden food, which might be considered as the most probable source of selenium, was being consumed at the time, since it was too early for the new supply, and there are usually not enough garden vegetables raised there to provide a liberal supply for the entire year. Thus the chief dietary constituents that might possibly have carried selenium at that time were meats, milk and milk products, eggs, and a relatively limited amount of garden vegetables raised during the preceding year. Home-grown grain usually constitutes an important source of food for the animals, but probably little of it is used by the family group directly.

The survey comprised an examination of 111 families living on farms or ranches in the following States and counties: Eastern border of Wyoming— Albany and Niobrara Counties; southwestern South Dakota— Fall River, Custer, Pennington, Meade, Stanley, Hughes, Jones, Lyman, Tripp, Brule, and Gregory; Northern Nebraska— Boyd County. One hundred and sixty-seven subjects of those families were selected as suitable donors for urinary specimens. However, only 127 specimens were actually received in satisfactory condition and examined. These specimens represented 90 of the 111 families visited.

It may be of interest to note in passing that active so-called "alkali" disease in horses, cattle, or hogs was seen on only 11 farms, though in nearly all cases there was a very definite past history of this disturbance. In Wyoming this disease is often referred to as "blind staggers", apparently a more acute manifestation of selenium intoxication, if we may accept the views of Beath and his associates on this subject (*3*, *8*).

URINARY ANALYSIS FOR SELENIUM

The method we have used for selenium determination is based on that developed by Byers and his associates for its determination in organic material (*9*, *10*). Briefly, our procedure is as follows:

Fifty to 500 cc of urine,[2] according to the amount of selenium present, are treated in a Pyrex beaker with 25 cc of concentrated nitric acid, 30 cc of 30 percent hydrogen peroxide,[3] and 25 cc of concentrated sulphuric acid for 6 hours at room temperature. Thirty cc of hydrogen peroxide are added, and the mixture is then slowly evaporated on the water bath at 80° C. until nitric acid fumes begin to come off in appreciable amount. Additional quantities of 40 cc of concentrated nitric acid and 20 cc of concentrated sulphuric acid are then added and the oxidation process is continued on the hot plate

[2] We have used thymol or toluol as preservative.

[3] Merck's "Superoxol", and the cheaper product, DuPont's "Perone" have been found equally satisfactory.

for several hours until all traces of nitric acid have been removed, taking care that the temperature of the mixture does not exceed 120° to 122° C. The residue consisting of about 60 cc is then transferred quantitatively with the aid of about 40 cc of water to an all glass, Pyrex distillation apparatus,[4] 80 cc of 48 percent hydrobromic acid and about 0.5 cc of bromine are added, and the mixture is distilled into a 100-cc wide mouth Erlenmyer flask until about 75 cc of distillate have been collected. The ice-chilled distillate is then treated with sulphur dioxide until the bromine is completely discharged, about 0.5 gram of hydroxylamine hydrochloride is added, and the mixture is heated at 80° C. for 15 to 20 minutes.

In the presence of as little as 0.01 to 0.02 mg of selenium a fine distinctly perceptible red precipitate separates out over night. The precipitate is collected on an asbestos pad by suction filtration through a small Gooch crucible, washed with a little water containing some hydrobromic acid, dissolved with the aid of 5 cc of 1:10 bromine in hydrobromic acid, the solution being filtered into a 25 cc volumetric flask or accurately graduated cylinder, water is then added to make about 20 cc, sulphur dioxide gas is passed in to discharge the bromine, 1 cc of 10 percent hydroxylamine hydrochloride in 0.15 percent gum acacia is added, sufficient water is added to make 25 cc, and the mixture is heated at 80° C. for about 15 minutes. A set of standards is made up simultaneously, using suitable amounts of a stock standard solution of 0.05 mg selenium per cc in dilute aqueous solution of hydrobromic acid.[5] The standards are treated with bromine in hydrobromic acid, sulphur dioxide, and hydroxylamine hydrochloride in gum acacia solution in exactly the same manner as the unknowns. After cooling the solutions readings are made in the nephelometer,[6] matching the unknown against the nearest standard set at 20 on the scale.

The range of selenium that is most satisfactorily estimated in this manner is 0.01 mg to 0.1 mg. Quantities in excess of 0.1 mg are difficult to estimate accurately by means of the nephelometer. The limit of sensitivity of the method as we have used it is 0.005 mg of selenium. Having used in this work quantities of urine up to 500 cc, we have, therefore, been able to detect with a fair degree of certainty quantities as low as 1 to 2 micrograms per 100 cc. Five micrograms percent or more can be estimated by this method with an accuracy of ± 10 percent. In urine specimens collected in the laboratory from 20 normal individuals residing in Washington and nearby Maryland or Virginia we have been unable to detect selenium, and so if our control urines contained any selenium it was less than the order of magnitude of 1 to 2 micrograms percent.

[4] Manufactured by Will Corporation, Rochester, N Y

[5] The standard is made from an aqueous solution of Na_2SeO_3 analyzed for selenium gravimetrically.

[6] Klett colorimeter nephelometer has been used in this work

RESULTS AND DISCUSSION OF THEIR PROBABLE MEANING

We shall attempt to present the results of this investigation in summary fashion without omitting the more essential details. The findings will be discussed first from the clinical point of view and, second, from the point of view of the chemical data obtained in the urinary analysis for selenium.

From the clinical standpoint we may state at once that no symptom or group of symptoms could be discovered so far that might be considered pathognomonic of selenium poisoning in man. This is entirely in accord with the experience of local physicians with many of whom the problem was discussed. No serious illness was seen in any of the 111 families visited that could have been definitely attributed to selenium poisoning. Vague symptoms of ill health, and symptoms indicative of more or less serious damage to the liver, kidneys, skin, and joints were seen, and the impression was gained that the incidence of such disorders was rather high. It is evident, however, that the causes for such disorders are many, and in the present state of our knowledge it is impossible to determine the role of selenium, if any, in their causation. Respiratory diseases, on the other hand, were infrequently seen.

The following presents a broad statistical summary of the more pronounced disease states seen in the 111 families visited, exclusive of the more vague symptoms of anorexia, indigestion, general pallor, malnutrition, etc.:

1. Bad teeth, varying from marked discoloration through all stages of decay, were seen in one or more members of 48 families.

2. Yellowish discoloration of the skin, in many cases a very definite icterus, and in some cases seemingly associated with more or less definite liver disease, was seen in about 46 subjects.

3. Skin eruptions of varying degrees of severity, but not conforming to any one particular type, were seen in 20 subjects.

4. Chronic arthritis with more or less permanent changes in the joints was seen in 15 subjects. All degrees of involvement were noted in this group of patients, varying from the milder types of rheumatoid arthritis to the more severely deforming type of arthritis deformans. The hypertrophic degenerative type of arthritis was not seen.

5. Diseased nails of the fingers, and in some cases also of the toes, were seen in eight subjects. They were usually symmetrical, atrophic, brittle, irregular, and often presented transverse and at times longitudinal ridging. In some of the cases there was a history of sloughing of the diseased nails at irregular intervals. With the exception

of one case there was no history of suppuration, and no evidence of acute or subacute inflammation.

6. Lastly, subcutaneous edema of probably cardio-renal origin was seen in five cases, and peripheral neuritis of doubtful etiology was seen in two subjects. Fifteen subjects gave a history of more or less protracted gastrointestinal disturbances.

Whether or not selenium is implicated in any or all of the above conditions cannot be stated with any degree of certainty. In the discussion to follow, on the urinary selenium, an attempt will be made to correlate the clinical findings with the selenium concentration in the urine, and there we shall endeavor to point out probability or lack of probability as to cause and effect.

The urinary analysis for selenium revealed the following facts: One hundred and twenty-seven specimens, of as many subjects, representing 90 of the 111 families that had been visited, were received in good condition and were analyzed. The great majority of the specimens, more than 92 percent in fact, contained selenium, many in appreciable quantities, and some in amounts so high as to suggest probable intoxication, especially if viewed in the light of the small number of observations made on animals affected with so-called "alkali" disease. The concentration of urinary selenium is shown in some detail in table 1, where the whole series has been divided arbitrarily into seven groups, according to the amount of selenium found. It will be noted that the highest amount of selenium found in the urine of this series of cases was 133 micrograms percent.

TABLE 1.—*Urinary selenium concentration in 127 subjects, representing 90 families*

Group	Selenium, micrograms per 100 cc	Number of subjects	Percent of total
1	0	4	3.1
2	Trace	6	4.8
3	2 to 9	35	27.6
4	10 to 19	22	17.3
5	20 to 49	37	29.2
6	50 to 99	19	14.9
7	100 to 133	4	3.1

In a small series of urines obtained from three horses and one colt in various stages of "alkali" disease the selenium concentration ranged from 33 to 170 micrograms per 100 cc, as follows:

(1) Colt urine, autopsy specimen (see figs. 1 and 2), 33 micrograms per 100 cc; (2) catheterized specimen, horse no. 1, 100 micrograms per 100 cc; (3) catheterized specimen, horse no. 2, 125 micrograms per 100 cc; (4) catheterized specimen, horse no. 3, 170 micrograms per 100 cc.

In table 2 an attempt is made to correlate the clinical findings with the urinary selenium concentration. The cases are divided arbitrarily into seven groups, as in table 1, according to the selenium concentra-

tion in the urine; the number of cases showing symptoms, their ages, and the types of symptoms and their incidence are given in separate columns. The symptoms are given in the order of apparent greatest importance as regards probable cause and effect.

Analysis of the data given in table 2 does not reveal a constant causal association of health disturbances with selenium excreted in the urine. It may be fairly assumed that a higher concentration of selenium in the urine probably represents a higher level of intake, and a correspondingly higher concentration in the tissues; nevertheless, with the exception of the negative group, which is too small for statistical purposes anyway, there is but little difference in the percentage of symptomatic cases in the six groups with a wide selenium range in the urine from a trace to 133 micrograms percent. The percentage of symptomatic cases in these 6 groups runs irregularly from 63 to 75, it being almost the same in the low-selenium as in the high-selenium groups.

TABLE 2.—*Urinary selenium concentration in relation to age and clinical symptomatology*

Selenium, micrograms per 100 cc	Number of cases	Ages	Number showing symptoms	Age (years)	Symptoms and their incidence
0	4	10–42	1	42	Bad teeth, dermatitis.
Trace	6	10–62	4	19–62	Icteroid skin (2), bad teeth (1), dermatitis (2), gastrointestinal (1), edema (1).
2 to 9	35	5–70	22	12–70	Icteroid skin (8), bad teeth (12), dermatitis (6), arthritis (4), gastrointestinal (3), pathological nails (2), edema (2).
10 to 19	22	7–64	15	7–64	Icteroid skin (7), bad teeth (7), dermatitis (3), arthritis (4), pathological nails (1).
20 to 49	37	1–65	25	1–65	Icteroid skin (11), bad teeth (11), dermatitis (4), arthritis (2), gastrointestinal (4), pathological nails (2), anemia (1).[1]
50 to 99	19	4–62	13	35–62	Icteroid skin (7), bad teeth (6), dermatitis (4), arthritis (4), gastrointestinal (2), pathological nails (2), edema (2).
100 to 133	4	6–68	3	29–68	Icteroid skin (3), bad teeth (1), gastrointestinal (3).

[1] This was a case of severe hypochromic anemia with intestinal hemorrhages of unknown etiology in a 1-year-old baby referred to by Dr. E. B. Bradley of Spencer, Nebr. The urinary selenium was 32 micrograms per 100 cc.

The lack of more definite association of clinical evidence of selenium intoxication with its concentration in the urine does not, however, warrant the assumption of its harmlessness. Indeed we have the rather strong impression that some of the signs of ill health, though neither of a specific nor, in most cases, of a serious nature, may probably be the direct result of more or less continuous ingestion of small quantities of selenium over a long period of time. The high incidence of symptoms in the groups excreting relatively small quantities of selenium may be explained on the assumption that they are the manifestations of chronic irreparable damage wrought by the ingestion of the element in higher concentrations at some time in the past. Indeed, the amount of selenium ingested must of necessity

vary from time to time with changing climatic conditions, which undoubtedly have an effect upon the availability of locally produced selenium-bearing foodstuffs. The more surprising thing to us is that there is not greater definite evidence of serious injury, particularly in the groups showing the higher concentrations of selenium in the urine.

Selenium, as inorganic selenite or selenate, is a highly toxic element. It is often compared toxicologically with arsenic. Its acute toxicity on intravenous injection in rats we have found to be about two times as great as that of arsenic in the form of arsenite, the minimum lethal dose of selenium being 3.0 mg per kilo while that of arsenic is about 5 to 6 mg per kilo. It should be borne in mind that, according to the best available evidence, the selenium in selenium-bearing foodstuffs is in organic combination (*11, 12*) and may possibly have a different fate in the body from inorganic selenium even though its toxicity appears to be at least as great (*13*). More detailed information regarding the sources of selenium, accurate knowledge concerning the quantitative relationship between the selenium excreted to that ingested and stored in the tissues, more intimate knowledge concerning the chemical nature of the compound or compounds of selenium occurring in foodstuffs, and a thorough knowledge of the fate of these compounds in the body are some phases of the general problem requiring solution before its public health significance can be fully appreciated. Some of these problems are now under investigation.

From the standpoint of clinical diagnosis we can offer but little information. None of the subjects we have studied presented many symptoms suggestive of a similarity to chronic arsenic poisoning. We were impressed with the high incidence of icteroid discoloration of the skin and believe that this may have some significance. The high frequency of bad teeth seen in the subjects of our study may or may not have some significance. The same may be said of the rather high incidence of arthritis and of pathological disturbances in the nail structures. These symptoms are suggestive in view of the not infrequent occurrence of joint involvement in "alkalied" animals in association with the disturbance in the hoofs which is almost pathognomonic of this disease.

It has already been pointed out that the most pronounced symptoms and manifestations of ill health seen in the series of cases were (1) bad teeth, (2) icteroid skin, (3) dermatitis, (4) arthritis, (5) gastro-intestinal disturbances, and (6) diseased nails. To arrive at some conclusion as to the probable diagnostic significance of the above-named symptoms, all the cases of the entire series, the urines of which had been analyzed for selenium, were divided into the above clinical groups and the number of cases in each clinical group associated with no or with relatively high urinary selenium, respectively, was calculated on a percentage basis, as shown in table 3. In the analysis,

none or a trace is considered as no selenium, while 20 micrograms or more are considered as relatively high and assumed to be of probable significance.

TABLE 3.—*Association of certain clinical groups with urinary selenium*

Clinical group	Total number of cases with complete data on urinary selenium	Percent of cases showing—	
		No selenium in the urine	20 or over micrograms per 100 cc
Bad teeth	34	6	47
Icteroid discoloration of the skin	36	11	53
Dermatitis	19	16	31
Arthritis	13	0	30
Gastrointestinal	14	0	57
Pathological nails	7	0	57
Asymptomatic group	22	11	32

Inspection of the table will show that relatively high urinary selenium is most often associated with pathological disturbances of the nails, with gastrointestinal disorders, and with icteroid skin. The incidence of high urinary selenium in the clinical groups of dermatitis and arthritis was no greater than in the symptomless group.

Probably all that can be said at this time is that, in the presence of any or all of the above symptoms in an individual with a history of exposure to selenium through association with seleniferous soil and so-called "alkali" disease in livestock, a careful and thorough analysis of the urine for selenium should be made. A careful consideration of the findings in relation to the symptomatology may help to account for some of the obscure ailments in selenium-endemic regions.

SUMMARY AND CONCLUSIONS

A survey has been made of some of the rural population of parts of Wyoming, South Dakota, and Nebraska to determine the possibility of selenium intoxication through the ingestion of locally produced selenium-bearing foodstuffs.

A series of 111 families was studied for clinical evidence of selenium intoxication, and a series of 127 urines of as many subjects, representing 90 families, was analyzed for this element.

Many vague symptoms of ill health and some of a more serious nature were seen, most of which could be classified into six major clinical groups, none of which was sufficiently characteristic to be ascribed to the ingestion of selenium exclusively.

The results of the urinary analysis showed that only 8 percent of the cases were free or nearly free of selenium, while 92 percent contained amounts varying from 2 to 133 micrograms of selenium per 100 cc. This affords definite proof of the absorption of selenium by some of the rural population in the foregoing States.

The question as to the effects of selenium, in the quantities ingested, on the health of the population remains an open one.

ACKNOWLEDGMENTS

Our sincere thanks are due to E. P. Painter, South Dakota Experiment Station, Brookings, for carrying out many selenium analyses; to Drs. T. H. Ruth, director, animal husbandry, Pierre, S. Dak., and G. W. Cronen, assistant veterinary, United States Bureau of Animal Industry, Pierre, S. Dak., for valuable aid in securing animal material; and to Dr. O. A. Beath, Wyoming Agricultural Experiment Station, at Laramie, for much help in securing human material in Albany County, Wyo.

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PLAGUE INFECTION IN FLEAS FROM MONTEREY COUNTY, AND THE LAKE TAHOE REGION, CALIFORNIA

According to a report dated October 13, 1936, to Senior Surgeon C. R. Eskey from Dr. K. F. Meyer, of the Hooper Foundation, University of California, plague infection in fleas has been proved by guinea-pig inoculation as follows:

Fleas collected from ground squirrels (*Citellus beecheyi*) in the San Ardos area of Monterey County.

Pooled fleas taken from chipmunks (genus *Eutamias*) and ground squirrels (*Citellus beecheyi* and genus *Callospermophilus*) in the Lake Tahoe region.

A human case of plague was reported from Monterey County in June of this year,[1] but this is the first evidence of plague in ground squirrels in this county since 1931.

The fleas collected near Lake Tahoe were from the region where a human case of plague occurred in July of this year.[2]

[1] Public Health Reports, July 10, 1936, p. 939.
[2] Public Health Reports, Oct. 2, 1936, p. 1392.

COURT DECISION ON PUBLIC HEALTH

Tuberculosis, contracted by employee in business of manufacturing women's dresses because of conditions of employment, held not compensable as occupational disease under workmen's compensation act.—(Connecticut Supreme Court of Errors; *Madeo* v. *I. Dibner & Bro., Inc., et al.*, 186 A. 616; decided July 30, 1936.) An employee in the business of manufacturing women's dresses claimed compensation under the Workmen's Compensation Act for disability due to pulmonary tuberculosis. The finding disclosed that the tuberculosis from which she suffered was contracted because of conditions of employment. The commissioner awarded compensation, but the trial court sustained the appeal of the defendants, and plaintiff appealed to the supreme court of errors.

The compensation act defined a personal injury as including "occupational disease", which, in turn, was defined as "a disease peculiar to the occupation in which the employee was engaged and due to causes in excess of the ordinary hazards of employment as such."

The supreme court quoted from a prior case in which it had said that "to come within the definition, an occupational disease must be a disease which is a natural incident of a particular occupation, and must attach to that occupation a hazard which distinguishes it from the usual run of occupations and is in excess of that attending employment in general." Regarding this definition, the court, in the instant opinion, stated that "It does not include a disease which results from the peculiar conditions surrounding the employment of the claimant in a kind of work which would not from its nature be more likely to cause it than would other kinds of employment carried on under the same conditions." "In this case", said the court, "the plaintiff's disease resulted from the conditions of her particular employment in the factory of the defendants. Other trades carried on under those conditions would have been as likely to cause the disease as the manufacture of dresses."

The action of the trial court in denying compensation was sustained.

DEATHS DURING WEEK ENDED OCTOBER 10, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 10, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,885	7,556
Deaths per 1,000 population, annual basis	11.0	10.5
Deaths under 1 year of age	619	469
Deaths under 1 year of age per 1,000 estimated live births	56	43
Deaths per 1,000 population, annual basis, first 41 weeks of year	12.1	11.4
Data from industrial insurance companies:		
Policies in force	68,555,395	67,711,405
Number of death claims	10,639	11,077
Death claims per 1,000 policies in force, annual rate	8.1	8.5
Death claims per 1,000 policies, first 41 weeks of year, annual rate	9.9	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Oct. 17, 1936, and Oct. 19, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 17, 1936, and Oct. 19, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935
New England States:								
Maine	3	1	1			31	0	0
New Hampshire					2		0	0
Vermont						30	0	0
Massachusetts	2	10			68	38	1	1
Rhode Island	1				1	8	1	1
Connecticut	2	5	3	2	8	30	1	0
Middle Atlantic States:								
New York	17	30	[1] 13	[1] 10	55	144	8	12
New Jersey	17	13	10	9	33	15	0	0
Pennsylvania	24	54			26	45	4	5
East North Central States:								
Ohio	45	65	29	20	8	31	7	7
Indiana	40	89	22	17	1	5	5	1
Illinois	24	60	10	9	11	15	2	6
Michigan	5	18	2	4	10	36	1	1
Wisconsin	6	5	27	30	10	40	0	1
West North Central States:								
Minnesota	13	17	4	1	10	8	3	0
Iowa	7	8	5		3		2	0
Missouri	29	64	77	56	1	9	1	4
North Dakota		4			1	9	0	1
South Dakota	1	11		1	1	8	1	0
Nebraska	4	15			1	3	1	0
Kansas	7	23			1	2	0	2
South Atlantic States:								
Delaware		1				7	0	0
Maryland [2]	21	18	10	10	4	10	2	4
District of Columbia	6	6		1	3		0	2
Virginia	38	66			6	9	9	4
West Virginia	40	53	19	15		5	0	1
North Carolina [3]	149	119	4	8	7	3	1	4
South Carolina [3]	5	26	98	169	1	3	0	1
Georgia [3]	54	33					1	1
Florida	3	18	3	2		9	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 17, 1936, and Oct. 19, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935
East South Central States:								
Kentucky	27	59	9	10	3	51	2	1
Tennessee	65	88	18	4	3		2	1
Alabama [3]	35	13	26	25		3	2	1
Mississippi	22	25					0	0
West South Central States:								
Arkansas	8	17	27	10		1	0	0
Louisiana [3]	20	26	6	8	3	3	1	3
Oklahoma [4]	10	9	49	37	8	2	0	0
Texas [3]	57	130	123	130	3	3	2	1
Mountain States:								
Montana	1	1	37		1	27	0	0
Idaho			1	1	67	1	0	0
Wyoming		1			1	20	0	3
Colorado	8	13			2	3	2	0
New Mexico	8	14	4		21	13	0	0
Arizona	7	1	34	20			2	0
Utah [2]	1				1	1	0	0
Pacific States:								
Washington		2			5	53	0	0
Oregon	2	1	20	15	7	162	0	0
California	40	65	14	30	16	116	3	3
Total	883	1,328	705	654	422	1,012	67	72
First 42 weeks of year	20,021	26,026	144,721	108,230	273,299	701,383	6,476	4,727

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935
New England States:								
Maine	1	8	15	14	0	0	0	2
New Hampshire	1	2	7	3	0	0	0	0
Vermont	0	2	2	7	0	0	0	0
Massachusetts	2	47	72	140	0	0	4	4
Rhode Island	0	0	17	5	0	0	0	0
Connecticut	1	17	15	21	0	0	1	5
Middle Atlantic States:								
New York	14	84	153	321	0	0	25	20
New Jersey	0	26	34	75	0	0	3	3
Pennsylvania	8	13	177	297	0	0	43	42
East North Central States:								
Ohio	45	3	185	303	0	0	16	24
Indiana	3	3	59	125	1	1	1	7
Illinois	53	7	177	390	1	2	7	17
Michigan	11	16	164	135	0	0	14	10
Wisconsin	3	1	120	383	1	9	1	7
West North Central States:								
Minnesota	2	3	45	176	10	0	0	4
Iowa	7	7	66	93	8	2	4	7
Missouri	8	1	57	132	0	6	23	11
North Dakota	4	1	19	32	11	0	3	1
South Dakota	0	0	21	34	2	2	1	1
Nebraska	1	0	24	57	1	6	0	1
Kansas	1	0	40	80	3	0	2	8
South Atlantic States:								
Delaware	0	0	4	5	0	0	1	6
Maryland [2]	3	3	39	63	0	0	9	18
District of Columbia	0	1	6	14	0	0	0	2
Virginia	1	7	21	60	0	0	24	6
West Virginia	3	1	80	137	0	0	14	12
North Carolina [3]	2	8	88	95	0	0	9	5
South Carolina [3]	5	1	9	17	0	0	6	6
Georgia [3]	9	0	15	25	0	0	28	8
Florida	3	0	2	3	0	0	1	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 17, 1936, and Oct. 19, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935	Week ended Oct. 17, 1936	Week ended Oct. 19, 1935
East South Central States:								
Kentucky	4	13	53	104	0	0	26	19
Tennessee	[5]8	0	65	83	0	0	14	23
Alabama [3]	5	1	33	20	0	0	18	4
Mississippi	4	1	18	28	0	0	7	8
West South Central States:								
Arkansas	9	2	6	12	0	0	7	5
Louisiana [3]	1	3	9	10	0	0	16	13
Oklahoma [4]	0	0	5	11	0	0	26	11
Texas [3]	1	3	20	62	0	5	15	38
Mountain States:								
Montana	0	1	33	77	31	2	2	3
Idaho	3	0	37	21	2	0	1	0
Wyoming	0	0	6	32	1	0	0	0
Colorado	1	0	16	89	5	0	1	3
New Mexico	2	0	14	16	0	0	16	35
Arizona	0	1	7	8	0	0	4	2
Utah [2]	0	1	13	56	0	0	0	0
Pacific States:								
Washington	0	2	39	51	1	4	6	4
Oregon	4	5	15	50	0	0	4	2
California	13	20	140	154	0	2	9	12
Total	246	324	2,277	4,147	78	41	412	422
First 42 weeks of year	3,358	9,615	195,947	198,862	6,391	5,606	11,850	14,931

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever cases, week ended Oct. 17, 1936, 53 cases, as follows: North Carolina, 2; South Carolina, 2; Georgia, 30; Alabama, 15; Louisiana, 1; Texas, 3.
[4] Exclusive of Oklahoma City and Tulsa.
[5] Two preparalytic cases included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following reports of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August 1936										
New Mexico	1	13	2	8	19	2	1	23	0	36
North Dakota		6	2		1			12	9	2
Puerto Rico		46	79	2,021	91		3		0	70
September 1936										
Alabama	6	130	33	1,249		17	39	49	0	83
Idaho		2	3		1		3	20	0	11
Indiana	5	41	33		17		13	136	0	46
Iowa	2	13		2	9		24	93	11	15
Maryland	14	37	13	10	34	1	16	74	0	46
Massachusetts	4	28		3	106	1	8	188	0	19
Michigan	10	53	1	17	46		37	323	5	41
Minnesota	2	35	3	1	29		10	94	5	14
New Mexico	1	8	3	14	42	2	10	20	0	75
North Dakota		3	21		4		4	25	17	5
Ohio	12	88	35	5	57	1	108	431	2	193
Pennsylvania	13	86		1	94	1	27	425	0	130
South Carolina		333	341	1,623	2	78	0	22	0	46

August 1936

	Cases
New Mexico:	
Chickenpox	7
Conjunctivitis	1
Dysentery (amoebic)	1
Dysentery (bacillary)	32
Epidemic encephalitis	3
German measles	1
Mumps	16
Paratyphoid fever	1
Septic sore throat	1
Trachoma	1
Whooping cough	51
North Dakota:	
Chickenpox	11
Mumps	2
Trachoma	1
Puerto Rico:	
Chickenpox	13
Dysentery	75
Filariasis	1
Mumps	16
Ophthalmia neonatorum	4
Puerperal septicemia	9
Tetanus	9
Tetanus, infantile	9
Trachoma	1
Whooping cough	23

September 1936

	Cases
Anthrax:	
Pennsylvania	1
Chickenpox:	
Alabama	2
Idaho	4
Indiana	6
Iowa	11
Maryland	14
Massachusetts	75
Michigan	120
Minnesota	56
New Mexico	12
North Dakota	10
Ohio	98
Pennsylvania	244
South Carolina	13
Diarrhea:	
Maryland	67
Ohio (under 2 years, enteritis included)	86
South Carolina	471
Dysentery:	
Maryland	84
Massachusetts (bacillary)	1
Michigan (amoebic)	4
Michigan (bacillary)	7
Minnesota (amoebic)	4
Minnesota (bacillary)	6
New Mexico (bacillary)	15
Ohio (bacillary)	10
Pennsylvania (amoebic)	1

September 1936—Continued

	Cases
Dysentery—Continued.	
Pennsylvania (bacillary)	1
Epidemic encephalitis:	
Indiana	1
Iowa	2
Maryland	3
Massachusetts	2
New Mexico	1
North Dakota	2
Ohio	2
German measles:	
Iowa	2
Maryland	8
Massachusetts	32
New Mexico	1
Ohio	20
Pennsylvania	21
Hookworm disease:	
South Carolina	90
Impetigo contagiosa:	
Maryland	31
Lead poisoning:	
Maryland	3
Massachusetts	2
Michigan	2
Ohio	9
Pennsylvania	1
Mumps:	
Alabama	25
Idaho	15
Indiana	18
Iowa	17
Maryland	118
Massachusetts	180
Michigan	112
New Mexico	31
North Dakota	4
Ohio	55
Pennsylvania	229
South Carolina	23
Ophthalmia neonatorum:	
Alabama	1
Maryland	2
Massachusetts	90
Ohio	74
Pennsylvania	8
South Carolina	10
Paratyphoid fever:	
Maryland	1
Michigan	5
New Mexico	2
Ohio	2
South Carolina	7
Rabies in animals:	
Alabama	46
Indiana	57
Massachusetts	4
Michigan	6
New Mexico	1
South Carolina	21
Rabies in man:	
Alabama	1
Pennsylvania	1

September 1936—Continued

	Cases
Rocky Mountain spotted fever:	
Maryland	4
Septic sore throat:	
Idaho	1
Maryland	9
Massachusetts	3
Michigan	14
Minnesota	3
New Mexico	3
North Dakota	1
Ohio	52
Tetanus:	
Alabama	5
Maryland	2
Massachusetts	4
Ohio	3
Pennsylvania	3
Trachoma:	
Iowa	13
Massachusetts	4
Michigan	1
Ohio	3
Trichinosis:	
Massachusetts	3
Tularemia:	
Idaho	1
Minnesota	2
Ohio	2
South Carolina	1
Typhus fever:	
Alabama	38
Michigan	2
South Carolina	4
Undulant fever:	
Alabama	1
Indiana	2
Iowa	12
Maryland	8
Massachusetts	5
Michigan	10
Minnesota	2
New Mexico	6
Ohio	4
Pennsylvania	11
Vincent's infection:	
Idaho	1
Maryland	13
Michigan	31
North Dakota	6
Whooping cough:	
Alabama	35
Idaho	5
Indiana	42
Iowa	41
Maryland	527
Massachusetts	569
Michigan	702
Minnesota	236
New Mexico	17
Ohio	724
Pennsylvania	1,506
South Carolina	38

PLAGUE INFECTION IN MONTEREY AND PLACER COUNTIES, CALIF.

Under date of October 13, 1936, plague infection was reported proved by animal inoculation in fleas taken from rodents collected around Lake Tahoe, in the Carnelian Bay area, Placer County, Calif., and in the San Ardos area in Monterey County, Calif. (See a more detailed report on p. 1505.)

CASES OF VENEREAL DISEASES REPORTED FOR AUGUST 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevelance of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama [1]				
Arizona [1]				
Arkansas	185	0.93	95	0.48
California	1,167	2.07	1,196	2.12
Colorado [2]				
Connecticut [3]	218	1.27	189	1.10
Delaware	131	5.12	66	2.58
District of Columbia [1]				
Florida	188	1.16	76	.47
Georgia	1,255	3.75	462	1.38
Idaho	13	.27	30	.63
Illinois	1,163	1.49	1,071	1.37
Indiana	110	.32	148	.43
Iowa	88	.35	184	.73
Kansas	59	.32	74	.40
Kentucky	135	.47	274	.96
Louisiana [3]	186	.88	111	.52
Maine	30	.36	44	.52
Maryland	671	4.02	267	1.60
Massachusetts	462	1.06	562	1.28
Michigan	306	.85	569	1.22
Minnesota	254	.97	350	1.33
Mississippi	1,561	7.98	2,229	11.37
Missouri	368	.94	117	.30
Montana	30	.56	86	1.62
Nebraska	35	.26	86	.63
Nevada [2]				
New Hampshire	5	.10	34	.68
New Jersey	712	1.66	341	.80
New Mexico	44	1.00		
New York	7,254	5.63	2,099	1.63
North Carolina	1,504	5.28	612	1.79
North Dakota [1]				
Ohio [3]	558	.83	265	.40
Oklahoma [3]	192	.77	200	.80
Oregon	72	.71	182	1.81
Pennsylvania	283	.28	200	.20
Rhode Island	128	1.88	89	1.31
South Carolina [3]	249	1.24	323	1.61
South Dakota	11	.16	40	.59
Tennessee	573	1.97	376	1.29
Texas	203	.33	90	.16
Utah [2]				
Vermont	27	.72	38	1.01
Virginia	561	2.14	328	1.24
Washington	170	1.10	339	2.08
West Virginia	220	1.21	138	.76
Wisconsin [4]	14	.05	196	.67
Wyoming [2]				
Total	21,800	1.80	14,185	1.17

See footnotes at end of table.

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio	26	0.96	15	0.55
Atlanta, Ga.[1]				
Baltimore, Md	371	4.50	180	2.18
Birmingham, Ala	124	4.39	66	2.34
Boston, Mass	203	2.57	204	2.58
Buffalo, N. Y	182	3.07	68	1.15
Chicago, Ill	800	2.21	797	2.23
Cincinnati, Ohio [1]				
Cleveland, Ohio	163	1.75	105	1.13
Columbus, Ohio	42	1.37		
Dallas, Tex	28	.97	115	3.97
Dayton, Ohio [1]				
Denver, Colo	36	1.21	42	1.42
Detroit, Mich	230	1.33	311	1.80
Houston, Tex.[5]	235	7.02	82	2.45
Indianapolis, Ind.[1]				
Jersey City, N. J.[1]				
Kansas City, Mo	77	1.83	3	.07
Los Angeles, Calif.[1]				
Louisville, Ky	263	8.12	118	3.64
Memphis, Tenn	222	8.31	74	2.77
Milwaukee, Wis.[1]				
Minneapolis, Minn	56	1.15	115	2.36
Newark, N. J	254	5.48	124	2.68
New Orleans, La.[1]				
New York, N. Y	5,387	7.38	1,257	1.72
Oakland, Calif	34	1.12	28	.92
Omaha, Nebr	15	.68	16	.73
Philadelphia, Pa	190	.96	54	.27
Pittsburgh, Pa	78	1.14	28	.41
Portland, Oreg.[1]				
Providence, R. I	73	2.82	54	2.08
Rochester, N. Y	35	1.04	56	1.66
St. Louis, Mo	247	2.96	44	.53
St. Paul, Minn	24	.85	63	2.23
San Antonio, Tex.[2]				
San Francisco, Calif	198	2.95	135	2.01
Seattle, Wash	98	2.58	166	4.37
Syracuse, N. Y	59	2.71	35	1.61
Toledo, Ohio	66	2.17	48	1.58
Washington, D. C.[1]				

[1] No report for current month.
[2] Not reporting.
[3] Incomplete.
[4] Only cases of syphilis in infectious stage reported.
[5] Reported by the Jefferson Davis Hospital. Physicians are not required to report venereal diseases.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 10, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	0	3	3	0	0	0	0	26
New Hampshire:											
Concord	0		0	0	1	4	0	0	0	0	9
Manchester	0		0	0	2	0	0	0	0	0	17
Nashua	1			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	0	0	0	0	0	0	0	8
Rutland	0		0	0	0	0	0	0	0	0	3
Massachusetts:											
Boston	0		1	7	22	23	0	7	0	60	214
Fall River	0		0	0	1	0	0	1	0	0	27
Springfield	0		0	0	3	4	0	0	1	3	33
Worcester	1		0	2	7	6	0	1	0	13	45
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	17
Providence	0		0	0	2	11	0	1	1	5	57
Connecticut:											
Bridgeport	0		0	1	1	1	0	0	0	3	31
Hartford	0		0	0	0	7	0	0	1	12	30
New Haven	0		0	1	1	1	0	0	0	3	43
New York:											
Buffalo	3		0	2	7	6	0	4	1	4	108
New York	15	6	5	21	78	46	0	82	34	85	1,393
Rochester	0		0	0	2	0	0	0	0	0	56
Syracuse	0		0	0	2	9	0	3	0	18	49
New Jersey:											
Camden	6		0	1	2	0	0	0	1	0	25
Newark	0		1	1	3	1	0	2	0	19	75
Trenton	0		0	0	1	1	0	1	0	0	27
Pennsylvania:											
Philadelphia	4		2	2	12	28	0	28	8	105	435
Pittsburgh	3	1	1	2	12	34	0	5	0	28	146
Reading	0		0	1	1	0	0	3	0	10	38
Scranton	1			0		0	0		0	1	
Ohio:											
Cincinnati	2		1	0	4	8	0	13	1	1	146
Cleveland	3	9	0	2	15	25	0	15	0	31	197
Columbus	4	1	1	0	4	12	0	1	2	18	119
Toledo	0		0	4	3	6	0	2	0	15	60
Indiana:											
Anderson	0		0	0	2	1	0	1	0	1	9
Fort Wayne	2		0	0	1	0	0	0	0	0	22
Indianapolis	3		0	0	6	11	0	0	0	0	86
Muncie	0		0	0	1	0	0	0	0	0	21
South Bend	0		0	0	1	0	0	0	0	0	14
Terre Haute	0		0	0	0	0	0	0	0	0	11
Illinois:											
Alton	0		0	0	0	2	0	0	0	0	2
Chicago	3	4	3	4	31	69	0	28	0	61	694
Elgin	0		0	0	1	0	0	0	0	1	11
Moline	0		0	0	1	3	0	0	0	1	8
Springfield	0		0	0	0	4	0	0	0	1	16
Michigan:											
Detroit	5	2	0	4	11	47	0	11	3	73	254
Flint	1		0	0	0	1	0	1	0	8	27
Grand Rapids	0		2	2	0	12	0	2	0	8	39
Wisconsin:											
Kenosha	0		0	1	0	11	0	0	0	3	10
Madison	0		0	0	0	0	0	0	0	2	15
Milwaukee	4	1	1	1	5	26	0	4	1	23	95
Racine	0		0	0	1	3	0	1	1	4	14
Superior	0		0	0	0	1	0	0	0	5	7
Minnesota:											
Duluth	0		0	3	0	2	0	0	0	6	23
Minneapolis	0		0	2	3	3	0	1	0	6	109
St. Paul	0		0	0	5	6	0	3	0	16	50

City reports for week ended Oct. 10, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Iowa:											
Cedar Rapids	0			0		1	0		0	0	
Davenport	0			0		1	0		0	0	
Des Moines	0			0		0	0		0	0	19
Sioux City	0			0		3	2		0	0	
Waterloo	2			0		0	0		0	8	
Missouri:											
Kansas City	1		0	1	3	6	0	2	0	0	70
St. Joseph											
St. Louis	5		1	1	3	21	0	8	5	19	206
North Dakota:											
Fargo	0		0	0	0	3	0	0	0	0	4
Grand Forks	0			0		2	0		0	0	
Minot	0		0	0	0	0	1	0	0	0	10
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	12
Nebraska:											
Omaha	0		0	0	3	4	0	2	0	0	50
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	0	0
Topeka											
Wichita	2		0	0	2	3	0	0	0	0	28
Delaware:											
Wilmington	1		0	4	3	0	0	2	1	4	34
Maryland:											
Baltimore	0	4	0	0	10	15	0	16	2	105	195
Cumberland	0		0	0	1	4	0	0	0	0	19
Frederick	0		0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	10		0	5	11	7	0	14	2	33	173
Virginia:											
Lynchburg	2		0	1	1	1	0	0	0	0	19
Norfolk	1		0	4	5	1	0	1	0	0	31
Richmond	0		0	0	3	3	0	0	1	1	51
Roanoke	4		0	0	2	0	0	1	0	0	18
West Virginia:											
Charleston	1		0	0	2	1	0	1	2	0	32
Huntington	3		0	0	0	8	0	1	0	0	0
Wheeling	0		0	0	2	1	0	0	0	1	10
North Carolina:											
Gastonia	0			0		1	0		0	0	
Raleigh	0		0	0	0	0	0	0	0	0	16
Wilmington	3		0	0	0	2	0	1	0	0	8
Winston-Salem	2		0	0	2	1	0	0	1	0	14
South Carolina:											
Charleston	1	2	0	0	0	0	0	2	0	0	18
Columbia											
Florence	0		0	0	0	0	0	0	0	0	4
Greenville	0		0	0	1	0	0	0	0	0	17
Georgia:											
Atlanta	4	7	3	0	4	7	0	3	0	1	93
Brunswick	1		0	0	0	0	0	0	0	0	3
Savannah	0	1	0	0	0	0	0	0	0	3	39
Florida:											
Miami	0	1	0	0	1	1	0	2	0	2	21
Tampa	0	1	1	0	2	1	0	1	0	0	25
Kentucky:											
Ashland	0			0		0	0		0	0	
Covington	0		0	0	0	1	0	2			13
Lexington	0		0	0	1	8	0	2	1	0	24
Louisville	4		2	0	8	1	0	0	2	13	53
Tennessee:											
Knoxville	3		0	1	2	4	0	2	1	0	24
Memphis	1		0	1	4	9	0	2	1	0	57
Nashville	1		1	0	3	0	0	0	0	0	56
Alabama:											
Birmingham	2		0	0	5	2	0	6	2	0	55
Mobile	1		0	0	3	0	0	1	0	0	25
Montgomery	3			0		0	0		0	0	
Arkansas:											
Fort Smith	1			0		3	0		0	0	
Little Rock	0		0	0	1	0	0	3	0	0	4
Louisiana:											
Lake Charles	0		0	0	1	1	0	0	0	0	4
New Orleans	4	2	1	0	9	1	0	14	0	1	162
Shreveport	0		0	0	5	0	0	5	0	0	36

City reports for week ended Oct. 10, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oklahoma:											
Oklahoma City	2	21	0	0	3	2	0	0	0	0	32
Tulsa	1	-----	-----	0	-----	2	0	-----	1	0	-----
Texas:											
Dallas	4	1	1	0	6	2	0	3	0	2	67
Fort Worth	3	-----	0	1	4	0	0	1	1	0	34
Galveston	1	-----	0	0	0	0	0	0	1	0	9
Houston	6	-----	1	0	2	2	0	4	3	3	65
San Antonio	1	-----	2	0	2	0	0	6	0	0	62
Montana:											
Billings	0	-----	0	0	1	0	1	0	0	0	6
Great Falls	0	-----	0	0	1	1	1	0	0	3	7
Helena	0	-----	0	0	0	0	0	0	0	0	6
Missoula	0	-----	0	0	2	0	0	0	0	1	7
Idaho:											
Boise	0	-----	1	0	0	1	0	0	0	0	6
Colorado:											
Colorado Springs	0	-----	0	0	0	7	0	0	0	0	7
Denver	6	-----	0	2	3	8	0	6	1	43	95
Pueblo	1	-----	0	0	2	0	0	0	1	0	11
New Mexico:											
Albuquerque	0	-----	0	0	2	2	0	2	2	0	23
Utah:											
Salt Lake City	0	-----	0	2	1	6	0	2	0	7	48
Nevada:											
Reno	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Washington:											8
Seattle	0	-----	1	5	4	6	0	5	0	3	102
Spokane	0	-----	0	0	1	11	3	0	0	0	22
Tacoma	0	-----	0	0	1	-----	-----	2	1	3	37
Oregon:											
Portland	0	-----	1	1	9	7	0	0	0	4	-----
Salem	0	1	-----	0	0	0	0	0	0	1	-----
California:											
Los Angeles	10	11	2	1	12	7	0	16	1	33	298
Sacramento	2	1	0	0	1	31	0	0	0	9	24
San Francisco	0	-----	1	1	2	10	0	12	0	21	154

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
New York:			
New York	6	2	0
Rochester	0	0	1
Syracuse	0	0	1
Pennsylvania:			
Pittsburgh	1	0	0
Ohio:			
Cleveland	0	1	4
Columbus	0	0	2
Toledo	0	0	15
Indiana:			
Anderson	0	0	1
Indianapolis	1	0	0
Illinois:			
Chicago	1	1	28
Elgin	0	0	1
Michigan:			
Detroit	1	2	3
Grand Rapids	0	0	1
Wisconsin:			
Milwaukee	0	0	2
Racine	0	0	1
Iowa:			
Des Moines	0	0	1

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Missouri:			
St. Louis	0	0	1
Maryland:			
Baltimore	1	2	0
District of Columbia:			
Washington	1	0	1
Tennessee:			
Knoxville	1	0	1
Memphis	0	2	1
Nashville	1	0	2
Alabama:			
Birmingham	0	0	1
Mobile	0	0	1
Louisiana:			
Shreveport	0	1	0
Colorado:			
Denver	0	0	1
Washington:			
Spokane	0	0	1
Oregon:			
Portland	1	0	5
California:			
San Francisco	0	0	1
Los Angeles	0	0	5

Epidemic encephalitis.—Cases: New York, 1.
Pellagra.—Cases: Washington, 1; Atlanta, 1; Savannah, 3; Los Angeles, 2.
Typhus fever.—Cases: New York, 1; Savannah, 6; Dallas, 2.

FOREIGN AND INSULAR

CANADA

Manitoba—Poliomyelitis.—During the week ended October 17, 1936, 10 new cases of poliomyelitis were reported in the Province of Manitoba, Canada, making a total of 355 cases. No new cases were reported in Winnipeg.

Provinces—Communicable diseases—2 weeks ended October 3, 1936.—During the 2 weeks ended October 3, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				3	1					4
Chickenpox				170	106	44	57	35	88	500
Diphtheria		10	1	55	12	7	5	1		91
Dysentery				1	2		95			98
Erysipelas				7	3		1	1	7	19
Influenza		1			21					22
Measles		2	1	76	347	55	84	61	32	652
Mumps		4			189	9	21	9	55	287
Paratyphoid fever	1				4			1		6
Pneumonia		1			18		4		8	26
Poliomyelitis				30	53	147	17		3	250
Scarlet fever		15	8	140	172	98	37	98	41	609
Trachoma									14	14
Tuberculosis	4	3	20	86	82	20	30		45	290
Typhoid fever		1	5	32	37	10	5	4	3	97
Undulant fever					1					1
Whooping cough		10	2	107	244	5	33	21	18	500

JAMAICA

Communicable diseases—4 weeks ended October 3, 1936.—During the 4 weeks ended October 3, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox		3	Puerperal septicemia		1
Dysentery	3	2	Scarlet fever	1	
Erysipelas		3	Tuberculosis	30	85
Leprosy		5	Typhoid fever	7	100

VIRGIN ISLANDS

Notifiable diseases—July–September 1936.—During the months of July, August, and September 1936, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	July	August	September	Disease	July	August	September
Dengue	1		2	Schistosomiasis	2		
Diphtheria		1		Sprue		1	
Filariasis		6	5	Syphilis	7	6	4
Gonorrhea	16	13	13	Trachoma	1		
Malaria		1	2	Tuberculosis		2	2
Measles	1	5	2	Typhoid fever	5		1
Pellagra	2		1	Uncinariasis	6	6	4

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936				August 1936					September 1936			
						4	11	18	25	1	8	15	22	29	5	12	19	26
Afghanistan.[1]																		
Ceylon:																		
Batticaloa.[2]																		
Provinces	C		18															
India	C	16,605	24,028	21,278	15,291	3,960	4,259	4,568	5,130	5,318	1,339	4,857	5,544	5,915				
	D	7,988	11,745	10,634	7,672	2,026	1,929	2,162	2,383	2,710	2,2[illegible]3	2,295	2,596	2,797				
Assam	C	59	137	569	262	31	16	47	57	57	42	93	65	36	87	76		
	D	30	65	292	152	25	11	26	13	65	30	33	22	30	46	47		
Bassein	C			9	12	1							1					
Bombay Presidency	C	130	145	365	592	552	666		705	694	590	761	718	834	693			
	D	55	42	123	224	242	270		283	313	230	307	320	330	345			
Bombay	C				[3] 1		[3] 1									[4] 1		
Calcutta	C	802	799	1,012	580	52	39	37	26	24	26	23	18	12	14	16		
Central Provinces and Berar	C	217	357	715	971	241	306	367	435	763	785	1,214	1,591	1,377				
Chittagong	C			6	13	2		3		2		[3] 1			1	4		
Madras Presidency	C	2,751	1,677	1,556	2,064	652	875	923	1,204	1,284	1,263		1,411	1,520				
	D	1,340	758	787	902	296	365	425	535	610	593		663	716				
Madras	C	26	5	2			2	4							4	2		
	D	11	1					1		1								
Moulmein	C	10	2	3	1													
Negapatam	C	6	2		13	9	1	1	4	5	4	3	6	6	3	1		
	D	2			9	4		1	2		1	2	4	3	1	1		
Punjab	C		6	61	231	50	93	118	157	195	115	188	88	66	91			
Rangoon	C		4		2	1	2			1	1	1						
Sind State	C									10	3		1	6	19	19		
Tuticorin	C						12	14	3									
India (French):																		
Chandernagor Territory	C		6	2	7	2	1	4	1									
Karikal Province	C		4		8	8	37	27	45	32	32		13	21				
Pondichery Province	C	74	7	16	4	1						1						

Indochina (see also table below):																		
Bentre	C			1														
Pnom-Penh	C			1														
Siam:																		
Bangkok	C	143	59	52	36	7	7	3	5			1						
Provinces	C	961	649	288	34	21	22	6	17	15	9	32	28	33	29	7	16	14
On vessels:																		
S. S. *Chatala* at Rangoon from Chittagong	C	1																
S. S. *Kutsang* at Penang from Calcutta	C		1															
S. S. *Karagola* at Penang from Calcutta	C			1														
S. S. *Ekma* at Rangoon from Calcutta	C				1													
S. S. *Chakdina* at Calcutta from Chittagong	C								4									

Place		April 1936			May 1936			June 1936			July 1936			August 1936		
		1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indochina (French) (see also table above):																
Cambodia [4]	C		2			3	1	1		1		2				
	D		1			2	1	1		1		2				
Cochinchina [5]	C	4		1	1	1	1		4	1	3	3	1			
	D	3		1	1	1	1		4		3	3	1			

[1] During the week ended Oct. 10, 1936, cholera was reported present in Zurmat Province, Afghanistan.
[2] During the week ended Oct. 10, 1936, 3 cases of cholera were reported in Batticaloa, Ceylon.
[3] Imported.
[4] Suspected.
[5] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Mar. 1-28, 1936	Mar. 29-Apr. 25, 1936	Apr. 26-May 30, 1936	May 31-June 27, 1936	Week ended— July 1936: 4	July 1936: 11	July 1936: 18	July 1936: 25	August 1936: 1	August 1936: 8	August 1936: 15	August 1936: 22	August 1936: 29	September 1936: 5	September 1936: 12	September 1936: 19	September 1936: 26
Algeria:																		
Bone	C		[2] 3															
Oran Department	C												[2] 1		[2] 1		[2] 1	
Philippeville	C												[2] 1					
Argentina. (See table below.)																		
Azores. (See table below.)																		
Belgian Congo	C			1														
Brazil. (See also table below):																		
Santos	C										2	1	1					
	D										1							
São Paulo.[3]																		
British East Africa:																		
Kenya	C	9	11	42	39	4	1	5	3	10	2	6	3	4	7	1	4	
Tanganyika	C	5		3														
Uganda	C	62	57	153	76	25	24	22	25	18	13	30	19	17	18	17	33	
	D	58	55	148	73	25	22	21	25	17	12	28	19	15	17	17	26	
Ceylon:																		
Anuradhapura	C	1																
Colombo	C	3	3	3	3		1	2					1					1
	D	3	3	3	3		1	2										1
Plague-infected rats		3	8	8	2	1	1			1					1			
Hatton	C			3														
Manar	C		1															
Maskiliya	C								1									
Southern Province	C												1					
Weligama	C		1															
China: Manchuria.[4]																		
Dutch East Indies: West Java	C	700	604	553	363	90	70	86										
	D	689	602	550	362	89	70	86										
Ecuador:																		
Alausi	C															1		
Daule	C	1																
Guayaquil	C	1	1							2	1			1	1			1
	D		1									1			1		1	1
Plague-infected rats		1			3	1	3	1		1	1	1	1		1	4	1	

Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P		P		P		P		P		P			
Asyut Province	C	13	18	2	2											3		1
Girga Province	C	1	1	1														
Minya Province	C	5	1	1														
Suez	C				1													
France: Marseille [5]	C											1			1	1		
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district: [6]																		
Hamakua Mill sector company [6]																		
Paauhau sector [6]				2				2	1		1	2		3		7	10	5
Pohakea sector			4															
India	C	3,543	2,334	126	139	33	70	82	109	174	163	162	187	214				
	D	1,669	1,225	406	92	13	49	58	61	104	87	118	119	103				
Bassein	C	4	5	5	2	2	4	3			3	2						
Plague-infected rats											1					1		
Bombay Presidency	C	125	68	11	4				3	1	1	6	1	1	4			
	D	70	47	6	2				2		1	3	2		2			
Bombay	C				1													
Calcutta	C					[2] 1												
Central Provinces and Berar	C	456	487	52			1	2	6	1	27	15	38	66				
Karachi	C	5																
Madras Presidency	C	44	20	6		5	8	18	10	47	52		30	25				
	D	38	13	2		2	2	11	9	24	31		20	11				
Punjab	C	14	95	72														
	D	7	53	47														
Rangoon	C			5	2				2	1	1			1				
Plague-infected rats		2		1					1	2	1	1						2
Indochina (see also table below):																		
Longxuyen	C				1													
Pnom-Penh	C			1						1	2	1						
Saigon-Cholon	C		1															
Tanghai	C		2	4														
Madagascar. (See table below.)																		
Malta	C		3	1	3					1	2			1			1	2
	D		2		1					1								
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C												1	1				
Plague-infected rats			2		1		1			1			1					
Union of South Africa	C	41	[7] 6	6	32	[7] 1				[7] 1		[7] 3						

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] A report dated July 29, 1936, states that 23 cases of pneumonic plague with 18 deaths were reported in Sao Paulo, Brazil.
[4] A report dated Aug. 20, 1936, states that 5 cases of plague were reported at Kirin Province, Manchuria, China.
[5] A report dated Sept. 3, 1936, states that 2 plague-infected rats were reported in Marseille, France.
[6] Plague-infected rats have been reported in Hawaii Territory, Hawaii Island, Hamakua District, as follows: Week ended Aug. 5, 2 plague-infected rats, no location given; week ended Oct. 10, 1 plague-infected rat in Hamakua Mill sector company; week ended Oct. 3, 6 plague-infected rats, and week ended Oct. 10, 1 plague-infected rat, in Paauhau sector.
[7] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place	Mar. 1–28 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936 4	11	18	25	August 1936 1	8	15	22	29	September 1936 5	12	19	26
United States:																	
California:																	
Lassen County—Plague-infected squirrels				5	1												
Modoc County [8]—Plague-infected squirrels				13	3	1			10								
Monterey County [8] C				1													
Placer County [8] C								1									
San Bernardino County.[8]																	
Santa Cruz County [8]—Plague-infected squirrels				50	5			6									
Santa Rosa C		1															
Ventrura County—Plague-infected squirrels		1		P													
Idaho: Bonneville County—Plague-infected squirrels				7													
Montana: Beaverhead County.[9]																	
Nevada: Elko County—Plague-infected squirrels			P														
Utah:																	
Beaver County C					1												
Plague-infected marmots									1	1							
Plague-infected squirrels							1										
Garfield County [10]—Plague-infected prairie dogs										2							
Sevier County.[10]																	
On vessels:																	
S. S. *Ipanema* at Marseille from Bone and Philippeville C											1						
S. S. *Delambre* at Liverpool from Montevideo, Buenos Aires, Rosario, Santos, and Las Palmas—Plague-infected rats														2			

[8] Plague-infected fleas have been reported in California as follows: Week ended June 27, 1936, 3 lots in Modoc County, and 7 lots in Santa Cruz County: Aug. 18–21, 104 plague-infected fleas collected from ground squirrels in San Bernardino County. A report dated Oct. 13, 1936, states that fleas taken from ground squirrels in Monterey County and from chipmunks and ground squirrels in Placer County have been proved plague infected.

[9] During the week ended July 25, 1936, 153 fleas and 26 lice taken from 7 marmots (ground hogs) shot at the head of Small Horn Canyon, Beaverhead County, Mont., were reported plague infected.

[10] Plague-infected fleas in Utah have also been reported as follows: Aug. 24, 45 fleas taken from 23 prairie dogs in Garfield County, and July 28, 1936, 315 fleas taken from 11 ground squirrels in Clear Creek Canyon, Sevier County.

Place		March 1936	April 1936	May 1936	June 1936	July 1936	August 1936
Argentina:							
Salta Province	C					4	
San Luis Province	C		6				
Tucuman Province	C					1	
Azores	C		2	2			
Brazil (see also table above):							
Bahia State	C						[11] 46
Ceara State	C	54	1				[11] 106
Pernambuco State	C						[11] 45
Indochina (see also table above):							
Cambodia	C	1	1	1		4	
Cochinchina	C		1	1	1	6	
Madagascar (central region)	C	206	96	48	35	26	
	D	196	95	47	36	26	

Place		March 1936	April 1936	May 1936	June 1936	July 1936	August 1936
Peru	C	10	15	5	2	4	6
Libertad Department	C	1	6	4	1	3	1
Lima Department	C	3	6	1		1	2
Callao	C	4	1		1		
	D	1	1		1		
Plague-infected rats		P					P
Piura Department	C		2				3
Trujillo Department	C	2					
Senegal:							
Dakar [12]	C				2	1	
	D				2	1	
Thies [12]	C			2	1		
Tivaouane [12]	C		1	5	4	8	4
South-West Africa: Ovamboland	C			23			

[11] From January to August 31, 1936.
[12] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936 4	11	18	25	August 1936 1	8	15	22	29	September 1936 5	12	19	26
Algeria:																		
Constantine Department	C	-	1	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Oran Department	C	-		-	6	1	1	-	-	-	-	-	-	-	-	-	-	-
Angola. (See table below.)																		
Argentina (see also table below):																		
Corrientes Province	C	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jujuy Province	C	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil: Porto Alegre (alastrim)	D	-	3	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-
British East Africa:																		
Tanganyika	C	57	-	73	7	20	44	21	21	15	-	2	3	71	-	73	-	-
Uganda	C	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
British Somaliland	C	-	-	10	19	-	-	-	-	-	-	-	1	1	-	-	-	-
Canada:																		
Alberta	C	30	1	2	[1] 2	-	-	-	-	-	-	-	-	-	-	-	-	-
British Columbia	C	[1] 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ontario	C	-	[1] 1	-	-	-	-	-	[1] 2	-	[1] 1	-	-	-	-	-	-	-
Saskatchewan	C	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Ceylon: Colombo	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China (see also table below):																		
Amoy	C	-	1	-	3	-	1	-	2	-	-	-	-	-	-	-	-	-
Canton	C	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dairen	C	2	3	10	9	-	-	1	1	2	-	-	-	-	-	-	-	-
Foochow	C	P	P	P	P	-	P	-	-	-	P	-	P	-	P	-	-	-
Hangchow	C	8	5	6	4	1	-	-	-	-	-	-	-	-	-	-	-	-
Hankow	C	1	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Hong Kong	C	6	7	5	2	-	1	-	1	-	-	-	-	-	-	-	-	-
Nanking	C	33	79	75	16	4	1	-	-	-	-	-	-	-	-	-	-	-
Shanghai	C	23	50	49	17	3	6	3	2	4	4	-	1	-	-	-	-	-
Swatow	C	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tientsin	C	2	1	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
Chosen. (See table below.)																		
Colombia (see also table below)	C	88	30	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Dahomey. (See table below.)																		
Dutch East Indies: Palembang	C	1																
Ecuador: Guayaquil	C									1								1
Egypt: Provinces	C	5			2													
Eritrea	C	5	2															
Asmara	C		1															
Finland	C								6	6	1			1				
France. (See table below.)																		
Gambia (Upper)	C					38												
Great Britain: England and Wales—London and Great Towns	C			4														
Greece: Salonika	C	20	20	37	34	13												
Guatemala. (See table below.)																		
India	C	31,312	34,748	36,861	16,397	2,946	2,478	2,463	2,124	1,465	1,104	824	936	1,090				
	D	7,679	9,091	9,916	4,636	889	721	675	670	394	245	256	311	269				
Assam	C	321	219	270	95	14	9	18	13	14	17	14	14	20	24	19		
Bombay Presidency	C	2,820	2,859	2,747	962	233	149	187	78	152	74	126	73	85	[illegible]			
	D	556	560	501	192	41	34	33	20	22	20	29	18	11	8			
Bombay	C	277	322	237	99	10	18	12	6	13	6	10	7	3	2	2		
	D	157	195	155	68	9	11	5	3	8	4	10	3	3	2	2		
Calcutta	C	1,305	1,552	567	275	27		13	6	5	13	7	11	9	4			
	D	945	1,166	466	168	24		10	4	7	8	7	8	9	4	1		
Central Provinces and Berar	C	2,109	2,536	3,043	1,100	147	155	115	60	63	50	33	18	23	42			
Chittagong	D		1		3	11												
Cochin	C	7														2		
Karachi	C	23	36	19	5	1		1										
Madras Presidency	C	1,980	1,236	1,225	796	142	245	214	151	217	249		221	229				
	D	294	214	215	137	45	31	38	46	44	41		38	40				
Madras	C	12	1	5						1				1		1		
Moulmein	C	83	35	35	21	5	4	6	3	2	3	4	1		4	7		
Negapatam	C		3	1														
Northwest Frontier Province	C	1	21	11	16	7		4	4					7		7		
Punjab	C	437	372	377	320	48	9	26	30	9	14	8	4	17	19			
Rangoon	C	16	20	4	7	1				2		2		[2]1				
Sind State	C		90	249	194	4	11	27	12	10	10	1	4	6	19	19		
Vizagapatam	C	19	2	5	2					1			1					
India (French):																		
Chandernagor Territory	C		29	10	8													
Karikal Province	C		2															
Pondichery Province	C		2	2			6				1							
	D		2	1			2											
India (Portuguese)	C	9																
Indochina (see also table below):																		
Pnom-Penh	C				1			1			1				1		5	1
Saigon	C		1															
Tourane	C	1	1	1														
Iran	C	1			7		1			4				2	5	4		
Teheran	C						1				2			1	1			

[1] For 2 weeks.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936 4	11	18	25	August 1936 1	8	15	22	29	September 1936 5	12	19	26
Iraq	C	9	10	11	1						1							
Baghdad	C		2	1							1							
Basra	C		3															
Japan:																		
Kobe	C		1															
Moji	C	1																
Nagasaki	C		1															
Osaka	C	5		1	1	1		1			2	1	3	5	8	4	4	5
Yokohama	C			1														
Mexico (see also table below):																		
Chihuahua	C		2	2	2													
Guadalajara	D	39	33	21	6	1	1		1	1	1					1		
Mazatlan	C	2																
Mexico, D. F	C	12	20	23	15	3	2	2		6		1						
Monterrey	C	2	1															
San Luis Potosi	D	1																
Torreon	C	2						1	2								2	1
Morocco. (See table below.)																		
Mozambique. (See table below.)																		
Nigeria	C	1,697	509	427	1,028				[3] 512		[1] 32		2					
Lagos	C											1						
Nyasaland. (See table below.)																		
Oman: Sharjah and Pirate Coast	C	46																
Peru. (See table below.)																		
Portugal (see also table below):																		
Lisbon	C	5	3	1				1	1	1	1							1
Oporto	C				1					1								
Portuguese East Africa. (See table below.)																		
Salvador. (See table below.)																		
Saudi Arabia	C		12	6														
Sierra Leone	C	215	9	9	25	[1] 7		[1] 2		[1] 1		[1] 2						
Freetown	C		[1] 1	2														
Spain	C	15	24	12	23													

Straits Settlements: Singapore	C				[2]1												
Sudan (Anglo-Egyptian)	C	12	6	17	5				1		12	1				[4]100	1
Turkey. (See table below.)																	
Union of South Africa	C					1				P							

[1] For 2 weeks. [2] Imported. [3] For 4 weeks. [4] For 5 weeks.

On vessels:

S. S. *Karapara* at Rangoon from Calcutta	1 case	Mar. 9, 1936
S. S. *Egra* at Calcutta	1 case	Mar. 10, 1936
S. S. *City of Aukland* at Rangoon from Calcutta	2 cases	Mar. 15, 1936
S. S. *Khandalla* at Rangoon from Calcutta	1 case	Mar. 16, 1936
S. S. *Haishang* at Rangoon	1 case	Mar. 18, 1936
S. S. *Cranfield* at Madras from Calcutta	1 case	Mar. 27, 1936
S. S. *Hokuryo Maru* at Moji from Tientsin	1 case	Apr. 2, 1936
S. S. *City of Adelaide* at Colachel from Rangoon	1 case	Apr. 13, 1936
S. S. *Egra* at Rangoon from Calcutta	1 case	Apr. 13, 1936

On vessels—Continued.

S. S. *City of London* at Suez from Calcutta	1 case	Apr. 20, 1936
S. S. *Manipura* at Port Sudan from Calcutta	1 case	Apr. 23, 1936
S. S. *Kasagi Maru* at Moji from Shanghai	1 case	May 4, 1936
S. S. *Awaji Maru* at Nagasaki from Dairen	1 case	May 8, 1936
S. S. *Bhutan* at Kobe from Shanghai	8 cases	May 13, 1936
S. S. *Jinkai Maru* at Moji from Hongay	1 case	June 1, 1936
S. S. *Rohna* at Penang from Madras	1 case	June 11, 1936
S. S. *Maya Maru* at Moji from Shanghai	2 cases	June 18, 1936
S. S. *Talamba* at Rangoon from Calcutta	1 case	Aug. 11, 1936

Place		March 1936	April 1936	May 1936	June 1936	July 1936	August 1936
Angola	C	30	29				
Argentina (see also table above):							
Buenos Aires Province	C		7	12			
Corrientes Province	C						6
Entre Rios Province	C	1					
Jujuy Province	C	7	3	3	9	6	1
Belgian Congo	C	198	135	75	188	98	
Bolivia	C	62	18	31	8	29	12
China: Manchuria—Harbin	C			7			
Chosen	C	345	313	183	84		
Colombia (see also table above):							
Barranquilla	D	1			1		
Dahomey	C	11					
France	C	30				30	
Guatemala	C	2	5	1	3	5	13
Indochina (see also table above)	C	196	221	142	78	93	119
	D	15	30	19	10	8	21
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	4	4	2			
Chihuahua State—Chihuahua	C	1					
Colima State	C	1					
Guanajuato State	C	5					
Jalisco State—Guadalajara	C	70	39	37			
	D	43	34	26			

Place		March 1936	April 1936	May 1936	June 1936	July 1936	August 1936
Mexico—Continued.							
Lower California	C			1			
Mexico State	C	4	6	4			
Mexico, D. F.	C	18	13			12	
Mexico City	C			26			
Morelos State	C	1					
Puebla State	C	2					
Puebla	C	2	1	2			
Queretaro State	C					1	
Quintana Roo	C	1					
San Luis Potosi State—San Luis Potosi	C	8					
Sonora State	C	1	1				
Tlaxcala State	D	1					
Morocco	C	2	15	6	3	3	2
Mozambique	C	2	5				
Nyasaland	C	1	3				
Peru	C	21	30	10			
Portugal (see also table above)	C	49	16	24	39		
	D	8		2	3		
Salvador	C	13	39	48			
Turkey	C	1	1	16		16	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936: 6	June 1936: 13	June 1936: 20	June 1936: 27	July 1936: 4	July 1936: 11	July 1936: 18	July 1936: 25	August 1936: 1	August 1936: 8	August 1936: 15	August 1936: 22	August 1936: 29	September 1936: 5	September 1936: 12	September 1936: 19
Algeria:																				
Algiers Department	C	64	77	80	3		74	8	12	16	24	21	2	4	10	8				
Algiers	C			4	1		2				1			1						
Constantine Department	C	49	62	61	5		14	5	9	22	5	8	30		2	8	2			1
Bone	C			1																
Constantine	C	1		2	1						2					2				
Philippeville	C				1															
Oran Department	C	12	32	12			6	2	1						1	1				
Australia: Sydney	C			1																
Basutoland	C	[1] 3		15																
Bolivia. (See table below.)																				
Bulgaria	C		47													1				
Chile	C	235		190		[2] 248							[2] 235							
Valparaiso	C	8	12	2	3	1			1	1		1			1	1	1	1		
China:																				
Hankow	C	1	3	2	1			4	1											
Nanking	C		1						1											
Shanghai	C			3	3	3	1													
Tientsin	C	1	1	4	2		2		5	1			1							
Tsingtao	C	1		1						1						1				
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	8	1	1					1	1					1	1				
Aswan Province	C																			1
Asyut Province	C	2	1	2							2			3	1					
Beheira Province	C	103	49	28	35						8			1						
Cairo	C	1	6	8		1			1	1	1			1						
Dakahliya Province	C	14	6	15	9						1									
Faiyum Province	C										1									
Gharbiya Province	C	131	33	32	27					5				3						
Girga Province	C		1							1					2					
Minufiya Province	C	18		2	2					1				2						
Port Said	C			1																
Qena Province	C	25	20	1	1															

Suez	C							1						1						
Provinces	C	372	563	521	93	72	76	95	80	21	20	14	8	14	5	2	1		3	1
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	24	4	5	1	1	1	1	1					1	1	1	1	1	1	
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	7		1						1	1	1		1		1	1	4		2
Hungary	C	7	4	1														1		
Iran	C	9	25	21	5	6	4	2	8				4					2		
Teheran	C	4	11								1									
Iraq	C							1												
Irish Free State:																				
Galway County:																				
Bothar Buidhe	C							1		1										
Oughterard	C									1	1									
Kerry County—Dingle	C																2	1	2	
Mayo County	C		2	1																
Latvia. (See table below.)																				
Lithuania	C	13	10	4	2	9														
Mexico (see also table below):																				
Durango	D													1						
Mexico, D. F.	C	42	44	33		3	7	3	3	4	7		4	1	7	6				
San Luis Potosi	D						1					1								
Torreon	C						1			1									1	
Morocco (see also table below)	C	5	39	28	2		3	2	2	4				1						
Palestine:																				
Haifa	C		1	8	2	1	[4]9	1	[4]2	1	1	2	4	1	3	2	3	1	4	5
Jaffa	C											5			5	2	6	5	3	7
Panama Canal Zone. (See table below.)																				
Paraguay: Asuncion	D												1							
Peru. (See table below.)																				
Poland	C	619	519	587	89	85	45	33	51	44	27	14	22	10	3	5	9	6	11	
	D	39	29	35	3	4	3	5	1	3	4	3								
Portugal (see also table below): Oporto	C	1																		
Rumania. (See table below.)																				
Spain: Catalonia	C								1											
Straits Settlements: Singapore	C	2	1							2		1								
Trans-Jordan	C	6	10																	
Tunisia:																				
Tunis	C	9	4	3		2		1			1	1		1				2		
Provinces	C	138	127	114	10	21		18	7	17	7	9	7	11			3	10	3	
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Rotterdam from Algiers	C			1																

[1] For 2 weeks.
[2] For 6 weeks.
[3] For 5 weeks.
[4] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		March 1936	April 1936	May 1936	June 1936	July 1936	August 1936
Bolivia	C	110	75	33	46	47	29
China: Manchuria—Harbin	C	9		33	29	15	
Chosen	C	259	312	225			
Czechoslovakia	C	219	99	49	23		
Finland	C	5	112	10			1
Greece (see also table above)	C	6	5	3	4	3	10
Guatemala	C	6	114	116	59	30	30
Latvia	C	5					
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	5	5	5			
Durango State	C	1					
Guanajuato State	C	56	2				
Leon	C	20					
Jalisco State: Guadalajaro	C					1	
Mexico State	C	15	6	6		3	
	D			2		2	
Mexico, D. F.	C	52	40			23	
Mexico City	C		20	26			
	D			15			
Mexico—Continued.		3	3	3			
Puebla State: Puebla	C			1			
Queretaro State	C						
San Luis Potosi State: San Luis		6	3	3		3	
Potosi	C					1	
Sinaloa State	C	1					
Tlaxcala State	C	7	45	26	9	6	
Morocco (see also table above)	C	1			2		
Panama Canal Zone	C	118	103	81			
Peru	C	1	1		1		
Portugal (see also table above)	C	1,581	1,537	1,113	427	168	
Rumania	C	33	79	39	25	39	
Turkey	C	4	1	1	1	2	
Istanbul	C						
Union of South Africa:		39	48	71	60	58	
Cape Province	C	3	1	2	1		
Natal	C	5	18	10	21	2	
Orange Free State	C	3	3		1		
Transvaal	C	113	106	125	78	53	16
Yugoslavia	C						

YELLOW FEVER

Place		Mar. 1–28, 1936	Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	Week ended— June 1936: 6	13	20	27	July 1936: 4	11	18	25	August 1936: 1	8	15	22	29	September 1936: 5	12	19	26
Bolivia: Santa Cruz Department.[1]																					
Brazil:[2]																					
Amazonas State	C	1		3																	
Maranhão State	C			1																	
Matto Grosso State	C	1	2				1														

Minas Geraes State	C	7	2	5	1																
	D	7	2	5	1																
Paraná State [2]	C	19	3																		
São Paulo State [2]	C	35	[3] 3	16	2	3	1														
Colombia:																					
Boyaca Department.[4]																					
Cundinamarca Department	D								1		1		1								
Intendencia of Meta—																					
Restrepo [4]	D								1					1	1						
Villavicencio.[4]																					
Santander Department [4]	D												1	3							
Dahomey	C									[5] 1											[5] 1
French Guinea—Macenta	C																		1	[5] 1	
Gold Coast:																					
Koforidua	C		1				1														
Kumasi	C	1																			
Seprawase	C		1																		
Ivory Coast: Vavua	C		1																		
Nigeria:																					
Aba	C																			[5] 1	
Ilorin Province	D																				[5] 1
Kano	C															[5] 1					
Niger Territory: Fada N'Gourma	C		1																		
Senegal:																					
Thies	C						1														
Tivaouane	C				1	1													1		
Sierra Leone—Daru	C																				[5] 1
Sudan (French):																					
Kayes	C								[5] 1												
Koulikoro	C																			1	

[1] Yellow fever has been reported in Santa Cruz Department, Bolivia, as follows: For the months of February, 2 cases; March, 10 cases; April, 1 case; May, 1 case; June, 2 cases.

[2] Yellow fever has also been reported in Brazil as follows: Paraná State, Feb. 16–25, 1936, 5 cases, 5 deaths; São Paulo State, no date given, 3 cases and 4 deaths. Mar 24–31, 1936, 2 cases, 2 deaths.

[3] Includes 1 case of yellow fever reported in the city of São Paulo, Brazil.

[4] Yellow fever has also been reported in Colombia as follows: Boyaca Department, Jan. 4 to May 15, 9 deaths; Restrepo, June 4 to July 26, 6 deaths; Villavicencio, January, June, and July, 6 deaths; Santander Department, June and July, 6 deaths.

[5] Suspected.

×

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen ROBERT OLESEN, *Chief of Division*

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PUBLIC HEALTH REPORTS

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PLAGUE ERADICATIVE MEASURES ON THE ISLAND OF MAUI, TERRITORY OF HAWAII

By A. L. Dopmeyer, *Sanitary Engineer, United States Public Health Service*

GEOGRAPHY, CLIMATE, AND INDUSTRIES

The Hawaiian Islands are situated about 2,000 miles southwest of San Francisco and consist of summits of a submarine volcanic mountain chain. In addition to the commercially important islands of Oahu, Hawaii, Maui, Kauai, Molokai, and Lanai, there are a number of smaller ones of lesser importance. In area, the Island of Hawaii is the largest, with 4,015 square miles, Maui ranks second with 728 square miles, and Oahu third with 598 square miles. In population, Oahu, containing the port of Honolulu, is by far the largest, Hawaii, with the port of Hilo, ranking second, and Maui, with the port of Kahului, third. In 1935 the population of Oahu was 210,000, Hawaii 76,700, and Maui 52,200; and the total population of the Territory was 384,400.

The islands are largely mountainous, with numerous peaks, the highest of which, located on the island of Hawaii, has an altitude of 13,825 feet above sea level. The island of Maui, with which this report deals, consists of mountains in the west and east sections connected by a low isthmus 6 miles wide. The crater of Haleakala, with a rim elevation of over 10,000 feet and a circumference of 21 miles, is located in the eastern section and is a part of the Hawaii National Park. The coast line of this island is rugged for the most part, with numerous gulches emptying into the sea, except in the low central portion.

The climate of the islands is moderate, and much lower temperatures prevail than in other countries of the same latitude, owing to the almost constant northeast trade winds and the return ocean current from the region of the Bering Straits. The average mean temperature at sea level is about 75° F., with a maximum of 80° and a minimum of 70°. There is a temperature drop of about 4° in the first 1,000 feet of elevation, beginning at sea level, and an average of 3° per 1,000 feet thereafter. The higher peaks of Hawaii and Maui are occasionally snow-capped.

There is a large variation in rainfall, even between localities a short distance apart, owing to many local influences. For the island of

Maui recorded annual figures vary from 8 inches at one station to over 400 inches at another. The station with over 400 inches is midway between Wailuku, with 30 inches, and Lahaina, with 13 inches, which are only 12 miles apart. The wettest place in the islands is at an altitude of 6,000 feet, on Mount Waialeale, Kauai, where the annual rainfall reaches 451 inches. Figures for various points in central Maui in and around the region where plague has occurred are shown in table 1. Relative humidity figures for Maui are not available, but they are probably about the same near sea level as at Honolulu, where the average is 68 percent at 8 a. m., 71 percent at 8 p. m., and 62 percent at noon.

TABLE 1.—*Average precipitation in inches, central Maui*

Month	Location							
	Kahului [1] (elevation 8 feet)	Paia [2] (elevation 180 feet)	Wailuku [3] (elevation 200 feet)	Haiku [4] (elevation 530 feet)	Puunomalei [5] (elevation 1,480 feet)	Makawao [6] (elevation 1,700 feet)	Haleakala Ranch [7] (elevation 2,000 feet)	Kula [8] (elevation 4,000 feet)
January	3.37	3.96	4.76	8.07	7.89	9.25	7.10	4.61
February	2.17	5.70	3.93	6.25	7.45	6.65	6.45	4.59
March	2.05	5.74	3.61	6.24	8.75	6.79	6.06	3.83
April	1.92	2.87	3.43	7.50	8.47	6.37	4.61	2.54
May	.94	1.83	1.35	5.17	5.17	3.99	2.37	2.52
June	.22	1.37	.51	3.86	8.40	1.35	.90	1.78
July	.38	1.68	.69	5.19	4.30	2.64	1.34	1.90
August	.43	1.95	.84	4.69	4.83	3.35	2.12	2.74
September	.43	1.77	.87	3.80	4.48	3.41	2.15	2.96
October	.95	2.43	1.17	4.33	4.71	4.17	2.15	2.18
November	1.93	4.94	2.83	6.90	8.54	6.06	5.80	2.11
December	3.54	4.09	5.02	7.26	9.38	10.36	8.02	3.92
Total	18.33	38.33	29.01	69.26	77.46	64.99	40.67	35.68

[1] Figures for 27 years up to 1924.
[2] Figures for 12 years up to 1906.
[3] Figures for 33 years to date.
[4] Figures for 19 years to date.
[5] Figures for 38 years to date.
[6] Figures for 20 years up to 1928.
[7] Figures for 42 years to date.
[8] Figures for 44 years to date.

There is a great deal of wealth in the islands, derived principally from the thriving sugar industry. On account of favorable weather and other conditions, one crop is being harvested while another is growing or is being planted. The sugarcane matures within 15 to 18 months after planting, and the yield averages 6 tons of sugar per acre. In central Maui, where the fields are irrigated, the production is as high as 12 tons per acre, and the cane stalks occasionally reach a length of 40 feet. Over 6,000,000 gallons of water per acre are used to bring a cane crop to maturity, or a million gallons per ton of sugar, and extensive irrigation projects have been installed to convey the water to the cane land. The mills produce raw sugar, which is shipped to the mainland for refining. The production of raw sugar in the Territory is approximately 1,000,000 tons per year, 20 percent of which is produced on the Island of Maui, with its four plantations and mills.

Second only to sugar is the pineapple industry, which has been developed on a large scale on the Island of Maui in recent years. Whereas sugarcane requires a great deal of water, pineapple is a desert fruit and can be grown in a much drier region. For this reason, cane is grown at elevations from sea level to 1,250 feet in central Maui to permit of irrigation by gravity, and pineapples are grown in a belt above this up to elevations of about 2,200 feet. There are four pineapple companies and four canneries on Maui. The production has grown steadily from about 1,500 cases of canned fruit in 1904 to over 2,200,000 cases in 1931, during which year about 12,800,000 cases were produced in the Territory. However, owing to an overproduction in that year, there was a marked drop in the following years; but the industry has now recovered and the demand for this product is growing steadily.

In addition to the sugar and pineapple industries, cattle raising is conducted extensively in central Maui. There are also several large chicken ranches and numerous truck farms producing for the Honolulu trade.

The port of Kahului is the only port on Maui where ships tie up regularly alongside a wharf. At the small ports of Hana and Mala some of the smaller vessels dock at infrequent intervals, but the larger vessels are required to discharge by lighter. The town of Kahului is owned by the Kahului Railroad, which furnishes transportation to and from the port. Wailuku, the largest town on the island, is located about 3 miles from Kahului, and, although it is an independent community to the extent that much of the property is privately owned, it is also the headquarters of one of the sugar companies. Puunene and Paia are headquarters of the two leading sugar plantations, and the towns are owned by the companies. These companies have large areas planted in cane in central Maui and they extend in the direction of the region where plague has occurred, one plague rat having been found, according to the records, at the Paia Mill, about 6 miles from the docks of Kahului. The town of Makawao, which is in the immediate vicinity of most of the rodent plague found to date, is a small independent community surrounded by pineapple land owned by several of the leading pineapple companies and small growers. Headquarters of the companies are at Haliimaile, Haiku, and Pauwela.

There are numerous gulches in the area where plague-infected rats have been found. Some of the gulches carry water during heavy rains but are dry most of the time; others are dry all of the time. Vegetation in the gulches is profuse and consists of a variety of wild plants, including beans, berries, and fruits, together with dense brush, and in many cases there is a heavy growth of cactus. In some instances sides of the gulches have been planted in pineapple, but this

has not been the general practice. There are also numerous large rock piles and rock walls in this area.

There is an excellent system of highways on Maui, and all roads between important towns are hard surfaced. A hard-surfaced road was completed in 1935 to the rim of the crater of Haleakala, facilitating the travel of tourists to this scenic attraction. There are altogether 155 miles of hard-surfaced road on the island, practically all of which is in central Maui, where almost three-fourths of the population is located. Although the Kahului Railroad has train service between various points at the lower elevations, there is a great deal of automobile trucking, especially during the summer months when the canneries are operating full time. There are no pineapple canneries in the Makawao district, and all fruit must be shipped by truck to canneries at Haiku, Pauwela, or Kahului. In spite of this, plague has not been found recently at any of these places. In the Kula region there is considerable dry farming, principally by small vegetable growers, and the produce is transported in trucks twice a week to Kahului for shipment by steamer to Honolulu and elsewhere.

SANITATION AND THE LOCAL HEALTH ORGANIZATION

Company towns such as Paia, Puunene, and Kahului, consist principally of employees' dwellings and company stores. In the case of the laboring classes, which are largely composed of Filipinos and Japanese, the houses are grouped into camps. In addition to living quarters the laborers of plantations are furnished medical service at the company hospitals as part of their compensation. Camp policemen are provided by the companies to look after sanitary and other conditions in the camps; and, since the plantations have been generally prosperous and under good management, the sanitary conditions have generally been good, with a few exceptions.

Local government on the island is in the hands of a county board of supervisors, the county of Maui including the entire island of Maui and other areas. However, in matters of health the county governs only its own hospitals; all other public health work is conducted by the Territorial board of health. On Maui at the time of this report, there are four board of health sanitary inspectors and a number of nurses engaged in full-time routine activities; and in addition to these a number of local doctors conduct work in different sections of the island for the Territorial board of health on a part-time basis. Visiting nurses are also employed by the plantations for work in the camps. Plague work is handled by a separate organization under the general direction of the Territorial health officer in cooperation with the United States Public Health Service, and at the present time is being supported financially by the Territorial

board of health, the United States Public Health Service, the Quarantine Tax Fund Commission of the Maui Chamber of Commerce (which collects a tax on incoming freight), the Federal Emergency Relief Administration, the Federal Rat-abatement Project Fund, and various plantation companies located in and around the plague region. The personnel engaged in the plague campaign at the time of this report (April 1936) consisted of the sanitary engineer in charge, 2 sanitary inspectors, 2 laboratory technicians, 1 clerk-stenographer, 1 field foreman, 1 assistant field foreman, 7 subforemen, 20 rat trappers, and approximately 200 field laborers, some of the latter working on a part-time basis. Approximately 50 of the laborers were furnished by plantations for work on plantation property.

OCCURRENCE OF PLAGUE IN THE TERRITORY OF HAWAII

Plague was first reported in the islands on Oahu at Honolulu in the latter part of the year 1899, and shortly thereafter it appeared on the islands of Hawaii, Maui, and Kauai. An epidemic occurred in Honolulu in 1900, and cases were found there for several years thereafter, but the disease apparently died out, as the last reported plague-infected rat in Honolulu was found in 1907. The last plague-infected rat found on the island of Oahu was in 1911.

The disease was apparently also short-lived on the island of Kauai, as no plague infection has been reported there since 1906. It has persisted on the island of Hawaii where, although it disappeared from the port of Hilo, it became entrenched in the Hamakua district about 40 miles from Hilo. Both human and rodent plague cases continue to be found in the Hamakua district of the island of Hawaii.

On the island of Maui, plague is reported to have first appeared at Kahului in the year 1900 and is believed to have been brought to this port by interisland steamer from Honolulu. The town was burned, and no evidence of the disease was again recorded until 1930, in which year it is believed that a number of deaths may have been due to plague. In August 1931 the first human case was definitely diagnosed as such, and between this time and September 1932 there were five cases with four deaths. All of these cases occurred in the vicinity of Makawao. No human plague is known to have occurred on this island since September 1932.

In September 1931 the first plague-infected rat was found at Haliimaile in the Makawao district and between this time and January 25, 1933, the records show that 15 plague-infected rats were found in 7 foci. In one instance infection was determined by mass inoculation. Then there was a lapse of over 20 months before the next infection was located on October 10, 1934, and between this date and September 13, 1935, nine plague-infected rats were found in five foci. This latter group of cases cannot be considered as a separate outbreak

as one of the foci was identical with one in the earlier group. The failure to locate plague during the 20-month interval was probably due to the character of the control activities during that period.

OBSERVATIONS ON THE RAT PROBLEM IN MAUI

The program in force in October 1933, when the writer came to Maui, consisted of the distribution of poison bait over an area of about 170 square miles, covering practically all of central Maui, supplemented by a small amount of trapping and laboratory examination of rats. Approximately 1½ million packages of poison were being distributed per month and the area was being covered once every 2 months. Poison bait consisted of mixtures of rolled barley, rice, or wheat, with corn oil or bacon, plus about 10 percent by weight of powdered arsenic. This mixture was wrapped in pieces of waxed paper 4 inches square, with the ends twisted to form the shape of a torpedo. Five trappers were bringing into the laboratory approximately 40 rats per day. Trapping was being carried out mostly in built-up areas, and there was no foreman. In the laboratory all rats were being examined macroscopically and one mass inoculation was made each day, using material from all rats examined. When a suspicious rat was found by macroscopical examination, inoculation of a separate animal was made and slides were prepared for examination under the microscope.

The only species of rats found in central Maui were *Rattus hawaiiensis*, *Rattus alexandrinus*, and *Rattus rattus*. For some unknown reason *R. norvegicus*, the most common rat in some regions, was not trapped at all, either at sea level or higher elevations, in this section. The records show that it was trapped in other parts of the island both at sea level and at higher elevations. *R. alexandrinus* and *R. rattus* were found mostly in or near buildings and also in nests in algaroba (mesquite) trees. The native rat, *R. hawaiiensis*, typically a field rat, was found mostly in gulches and old pineapple fields and along the edges of cane fields. It is much smaller than the other two species and was found to be less hardy and wary and easier to trap. According to the records, more than one-half of the rats trapped were *R. hawaiiensis*.

The mongoose was brought to this island some years ago to control the rat population on account of rat damage to cane in some sections and is found today in all parts of the island. It is believed, however, not to have had any marked effect on the rat population, probably due to the fact that it is active during the day whereas the rat carries on its activities during the night.

In view of the fact that the area in question was mostly rural and the work was concerned largely with a field rat, the poisoning program

presented the least difficulties. There were no data available, however, to indicate that this program was actually accomplishing the desired result, namely, the reduction of the rat population to a point where plague would die out, or that it had been successful elsewhere. Poisoned rats could not be found and the rat catch was not diminishing, as shown in table 2. According to reports of the rat catchers, rats were being caught mostly in gulches and in old pineapple fields overgrown with brush and weeds, and investigations in the field showed that there was a plentiful supply of natural food in the

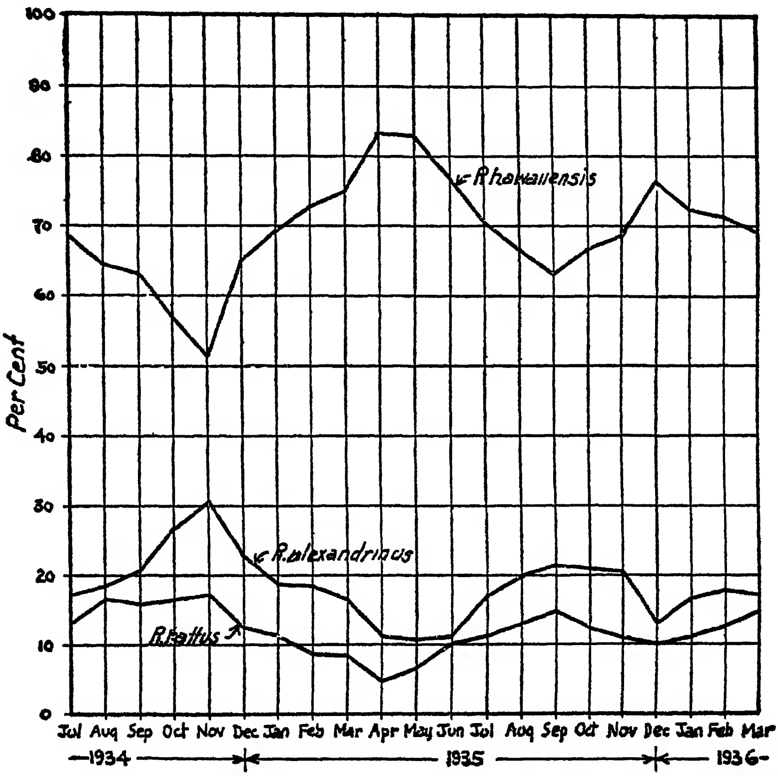


FIGURE 1.—Percentages of various species of rats caught in plague zone and adjacent areas.

gulches and elsewhere in the form of wild berries, seeds, and fruits during the entire year. At least a dozen different varieties of rat-eaten food could be picked up in a short time, including the fruit of the cactus which grows prolifically in certain sections. It appeared, therefore, that there was no great inducement for rats to eat poisoned food to any extent when such an abundance of other food was available.

A study of the locations where plague-infected rats had been found up to that time showed that those that had not actually been taken

out of gulches or old pineapple fields had been found in places adjacent to heavily rat-infested fields or gulches. It was also noted that 12 of the 15 plague-infected rats were of the species *alexandrinus* or *rattus*, and it appeared probable that rats of these species were preying upon the smaller and more numerous *hawaiiensis*. It seemed likely that the reservoir of infection was in the *hawaiiensis* and that it was being brought to the surface by the other two species.

TABLE 2.—*Results of trapping in Makawao (plague zone) during intensive poisoning campaign*

[From files of the Territorial board of health]

Month	Rat trap days	Number of rats caught	Rats per 100 traps per day	Packages of poison placed in central Maui (including Makawao)
1933				
April	3,705	490	13.22	1,001,726
May	3,900	404	10.35	1,265,283
June	3,894	301	7.73	1,335,523
July	3,629	134	[1] 3.69	1,055,401
August	3,693	265	7.17	1,505,196
September	3,735	352	9.42	1,240,000
October	3,888	379	9.74	1,310,175
November	3,590	404	11.25	1,561,655
December	3,742	302	8.07	753,105
1934				
January	3,617	429	11.86	770,770
February	3,268	332	10.15	826,359

[1] Low figure due to poor trapping by trapper who worked 7 weeks only.

Poisoned bait consisting of grains mixed with thallium sulphate, barium carbonate, and other poisons had been used for some time by certain sugar plantations to reduce rat damage to sugar cane. One company in particular, on the island of Hawaii, claimed that good results had been obtained with wheat treated with thallium sulphate. Upon investigation, however, it was found that no data were available and that results were based only on general observations. It appeared reasonable to assume that in a heavily rat-infested cane field some results could be expected from poisoned grain. It did not appear reasonable to assume, however, that rats would continue to eat poison or eat it to such an extent that the rat population would decrease to the point where plague would die out.

In the area in question on Maui, managers of sugar plantations stated that rat damage to cane was negligible. Trappers' records showed that very few rats were being caught in cane fields, although traps could be set only along the edges of the fields and along watercourses, as the fields in most cases were so dense that it was impossible for the trapper to penetrate them very far without losing his way. Due to the plowing of the cane land into ridges and furrows and the

irrigation of this land about twice a month by flooding, it appeared quite natural that there would be but a small rat population.

Rat damage to pineapple fields was limited to the later crops, or ratoons, and the amount of damage was stated to be about proportionate to the age of the field. The rat population in the pineapple fields also appeared to be in proportion to the age of the field according to the trappers' reports. It is not customary to weed pineapple fields, and after about the fourth year there is a fairly dense growth of weeds and other vegetation extending above the plants, occasionally growing to two or three times the height of the plants. Since the plant crop is not harvested until the second year and there are often four ratoon crops, pineapple fields are sometimes 6 years old before they are abandoned and plowed under. Owing to a poor market during the early depression years, many fields were abandoned and not plowed under for replanting, and as a result there was a great deal of heavily rat-infested land in the pineapple region.

Cane, on the other hand, is harvested in from 15 to 18 months after planting, and the land is immediately cleared for replanting or for a ratoon crop. When a crop is ready to harvest, the fields are set on fire and the flames burn up the dry leaves and trash without injuring the cane stalk, and in the burning process many of the rats that are in the field are killed either by the heat or by the workers.

These differences between the growing of cane and pineapple may account for the fact that plague existed in the pineapple region rather than in the cane region, although climatic conditions and the extent of gulches and other waste land in the Makawao district affording excellent rat harborage and food may also have been a factor.

In the section along the seacoast from Kahului to Lower Paia it was found that rats of the species *alexandrinus* and *rattus* were nesting in large numbers in the algaroba trees. These trees produce a bean during most of the year, which is eaten by the rat. The nests resembled bird nests but were usually larger and not as carefully made, and they could easily be distinguished after comparing a few of them. Nests were found with as many as 13 rats each. They could be brought down readily with a shotgun, but many sections were practically inaccessible at the time on account of the dense brush on the ground.

Buildings in and around the plague zone were generally poor from a ratproof standpoint. There were numerous small structures, such as pigpens, privies, wash houses, chicken coops, and various types of out-houses, which afforded potential if not actual rat harborage and which had never been inspected from a plague-control standpoint.

The piers and pier sheds at Kahului were of modern concrete construction and were free from rat harbors, with the exception of certain open spaces under the floors which were accessible to rats.

STUDY OF THE MEASURES IN USE

In view of the lack of information at the time concerning the effectiveness of the poisoning program, it was decided to carry on some experiments both in cages and in the field in order to obtain such data.

TABLE 3.—*Results of cage experiments using arsenic*

Experiment no.	Number and species of rats used				Number of rats dying	Days poison was eaten	Period of experiment (days)
	R. alexandrinus	*R. rattus*	*R. hawaiiensis*	Total			
1	4	1	0	5	3	First	5
2	0	5	0	5	2	First and second	5
3	0	0	4	4	1	First	5
4	6	2	0	8	4	do	5
5	5	2	0	7	1	First and second	10
6	0	7	0	7	0	First	10
7	4	1	0	5	1	do	5½
8	4	2	0	6	1	do	4
9	8	4	0	12	4	First, second, and third.	7½
10	4	4	0	8	2	do	17½
11	7	10	0	17	1	First and second	10
12	5	1	0	6	1	First	21
13	0	0	10	10	2	do	12
14	6	10	0	16	5	First, second, and third.	9
15	7	3	0	10	2	First and second	7
16	0	0	10	10	5	do	7
17	8	12	0	20	1	do	7
18	0	0	10	10	4	First	7
19	0	0	10	10	6	do	7

NOTE—Poison consisted of mixtures of rolled barley, rice, or wheat with corn oil plus 10 percent by weight of powdered arsenic and wrapped in waxed paper. Poison package was replaced with fresh package each morning and oftener when necessary.

Two cages, each 10 feet long by 18 inches wide by 18 inches high, were constructed of wood and lined with ½-inch mesh wire screen. Screen partitions were built in so as to make five compartments, and small openings cut in at the bottom of each partition to provide passage from one compartment to another. The top of each compartment was on hinges to gain entrance. The principal object in building the cage in this way was to keep the food and poison in one place so that a record could conveniently be kept of the amount taken at various times. It was also desired to provide enough floor area and climbing space to accomodate 10 rats without crowding and to avoid fighting. It was realized that the information to be obtained from any cage experiments would be limited, and it was desired to determine mainly to what extent rats would eat poison under these conditions. Natural food found in the gulches and elsewhere was placed in one end compartment together with poisoned bait and water, and burlap bags were placed in the other end as nesting material.

In order to carry on experiments with larger numbers of rats than these cages would accommodate, a larger cage was built later by screening a portion of the storeroom in the laboratory building with one-

half inch mesh wire screen, making a cage 12 feet long by 6 feet wide by 6 feet high.

Experiments were first conducted with mixtures containing arsenic, using packages from the supply on hand, and then similar work was done with wheat treated with thallium sulphate, using 4 pounds of thallium sulphate per 1,000 pounds of grain. The results obtained with arsenic are shown in table 3 and those with thallium sulphate in table 4. There was a variation in the number of rats used per experiment and in the sources from which the rats were obtained. It was found that some rats were occasionally killed in fighting when caged, but no large number of control experiments were conducted to determine the probable loss on this account and no allowance for this factor has been made. It was frequently necessary to collect rats over a period of several weeks to obtain a sufficient number from a certain locality to begin the experiment; and it was found that if a group of rats were kept in a cage for several weeks or more, additional rats placed in the cage would be killed by the others in a short time. Consequently, the rats used in a particular experiment could not be collected over a long period of time unless they were kept in separate cages before placing them in the experiment cage.

TABLE 4.—*Results of cage experiments using thallium sulphate*

Experiment no.	Number and species of rats used				Number of rats dying	Days poison was eaten	Period of experiment (days)
	R. alexandrinus	*R. rattus*	*R. hawaiiensis*	Total			
1	6	2	0	8	3	First, second, and third.	7½
2	3	5	0	8	1	First	7
3	1	7	0	8	6	First, second, and third.	7
4	8	2	0	10	1	First and second	7
5	0	0	10	10	7	First	7
6	8	2	0	10	3	First and second	7
7	12	16	0	28	5	First, second, and fourth.	12
8 [1]	13	10	0	23	2	Third and fourth	8
9 [2]	12	9	0	21	0	None	6
10	6	6	0	12	6	First and second	7
11	0	0	10	10	8	First, second, and third.	12

[1] Rats remaining from experiment no. 7 used after interval of 1 week.
[2] Rats remaining from experiment no. 8 used after interval of 1 week.

NOTE.—Poison consisted of wheat mixed with thallium sulphate, wrapped in waxed paper (4 pounds of thallium sulphate per 1,000 pounds of grain). Poison package was replaced with fresh package each morning and oftener when necessary.

The species of rats used for each experiment consisted of either a mixture of *alexandrinus* and *rattus*, or of *hawaiiensis* alone. *Alexandrinus* and *rattus* were mixed in the cages because they had frequently been found together in nests in trees and it facilitated carrying out the experiments, owing to the difficulty of trapping a sufficient number of one species in a short time. Trapping live rats was found to be difficult in some sections because the mongoose frequently killed the rat

in the cage, if the trapper did not empty his traps at daybreak, and the small *hawaiiensis* frequently escaped by forcing its way out between the wires where the mushroom type of cage trap was used.

The considerable variation in the results obtained may be due to various factors, especially the fact that, on account of the difficulty of trapping live rats, groups of rats were occasionally used which were obtained from different locations and which had been feeding on different kinds of foods. Both wet and dry foods were used in each experiment, and an attempt was made to obtain the kinds of foods on which the rats had been feeding, although this was not always practicable where a group of rats used in an experiment had been obtained from a number of locations. The cage experiments do not give an accurate picture of what might take place in the field, owing to the fact that the poisoned grain was at all times available, together with the other food, in a small area, and also owing to the fact that the rats were caged. They do demonstrate, however, that after one or more rats have eaten the poison and have become sick or have died from the effects the remaining rats almost invariably refuse to touch the package, and consequently the poison is not eaten after the first day or two.

Thallium sulphate appeared to be slightly more effective than arsenic, probably on account of its slower action, as a result of which it was taken over a longer period of time before it was recognized. Obviously, the effect of thallium sulphate was more pronounced on the *hawaiiensis* than on the other two species on account of the smaller size of this rat.

The ability of rats to recognize the poison even after a considerable period of time was clearly demonstrated in experiments 7, 8, and 9 shown in table 4. In experiment 7, 5 of the 28 rats died from the effects of the poison in the first few days of the 12-day experiment. The remaining 23 rats were then fed without poison in the same cage for 1 week, at the end of which time the poison was again introduced. Experiment 8 shows that only 2 of the 23 rats died during the 8 days in which poison was in the cage in this second period. Poison was then again removed from the cage for 1 week, after which time it was reintroduced for a third period, and during the 6 days' duration of this period, shown in experiment 9, none of the remaining 21 rats even opened the package.

At various times between March and June 1934, poison experiments were carried out in the field, using special areas set aside for this purpose. These areas varied in size from 500 to 1,500 acres, were located in different parts of the region being worked, and also varied as to kind of vegetation. The procedure was to trap an area for a week, then place poison packages and trap for another week with the object of determining whether there resulted any marked reduction in the

rate of rat catch which might be attributable to the poisoning. In all experiments the number of packages distributed in a certain locality depended on the nature of the area. In built-up areas, packages were placed in buildings wherever there appeared to be a likelihood of encountering rats. In areas planted in cane where the cane was too dense for the worker to go into the field, three packages were placed on the ground about every 25 feet along the edges of the field and along water courses. In pineapple fields two packages were placed every 10 feet along every other row. This procedure of placing in cane and pineapple fields was the same as that used in the original poisoning campaign. Arsenic was used in the first group of experiments, the results of which are shown in table 5. Coconut was used as trap bait in this as well as in all other work.

TABLE 5.—*Results of field experiments with poison using arsenic mixed with wheat, rice, or barley*

MARCH-JUNE 1934

Experiment no.	Area in acres (approximate)	Interval since previous poisoning	Trapping results during week before placing poison		Packages of poison placed	Interval between first and second trapping (weeks)	Trapping results during week after placing poison	
			Rats caught	Rats per 100 traps per day			Rats caught	Rats per 100 traps per day
1	1,500	6 weeks	86	6.14	30,479	1	82	5.86
2	1,000	2 months	180	12.86	24,144	1	179	12.79
3	500	10 weeks	58	4.14	10,647	1	53	3.79
4	500	2 months	106	7.59	7,096	2	142	10.14
5	500	10 weeks	99	7.08	6,727	0	51	3.64
6	500	6 weeks	87	6.21	50,619	1	114	8.16
7	500	5 months	57	4.14	11,993	4	78	5.59
8	500	do	70	5.02	3,591	3	89	6.41
9	500	2 weeks	[1] 123 125	8.79 9.67	7,834	0	111	7.93
10	500	do	[1] 95 59	6.79 4.21	26,910	0	72	5.14

[1] Area was trapped for 2 weeks before placing poison and 1 week after. Upper figure represents rats caught first week, lower figure rats caught second week.

NOTE.—In cane land three packages were placed every 25 feet along the outer edges and along water courses. In pineapple land two packages were placed every 10 feet along every other row. This method of placing determined the total number of packages per experiment.

It will be noted that the rates of rat catch vary considerably. Results such as these are to be expected in areas with numerous rat harborages and natural food in abundance, as the rat is not necessarily attracted to the trap out of hunger. In such areas the results probably depend more upon the luck than upon the skill of the trapper. It will be noted that in several instances the rate of rat catch after placing poison was higher than before, and only in one instance, experiment 5, was there a marked drop. In order to determine whether the results in experiment 5 were temporary as a result of trapping, owing to the fact that there was no interval between first and second trapping, or whether they were possibly accidental, experiments 9 and 10 were carried out on the same basis but with trapping

conducted for 2 weeks before poisoning. It will be noted that in the second week of trapping in experiment 10 there was a drop in catch without poisoning almost equal to that shown in experiment 5. It is also possible that the rat population in the area used in experiment 5 was not large and was actually reduced by trapping. Land in this area was planted in hay and corn, whereas all other districts contained cane or pineapple.

The results of these field tests with arsenic indicate that the poison was having no noticeable effect on the rat population.

Beginning July 1, 1934, the trapping districts were increased in number and rearranged so that trapping was intensified in the plague zone and surrounding areas. The placing of poison was continued in the trapping districts, with the exception of one small district which was used as a control, and at the same time the poisoning of areas outside the districts was discontinued. Table 6 shows that there was no apparent effect on the rat catch from arsenic poisoning in the districts in the plague zone during the calendar year 1934. The increase in trap days also did not affect the rate, although this was not anticipated unless it were to be done on a much larger scale, and even then permanent results could not be expected. In the small control district there was a gradual reduction in the rate of catch from 16.87 rats per 100 traps per day in July, to 8.60 in December, due to trapping alone, as shown in the first part of figure 2, but it was believed that this rate could not be reduced much further without a direct attack on the rat burrow and on the natural food supply.

TABLE 6.—*Rate of rat catch in and adjacent to the plague zone during 12 months in which poison was placed*

Month	Rat-trap days	Number of rats caught	Rats per 100 traps per day	Packages of poison placed
1934				
January	9,685	728	7.52	294,876
February	9,010	689	7.64	348,639
March	8,650	524	6.06	248,569
April	7,060	474	6.71	231,056
May	9,881	847	8.57	103,669
June	23,482	1,695	7.22	178,122
July	34,473	2,437	7.07	354,098
August	43,114	3,086	7.16	108,453
September	38,514	3,145	8.17	101,278
October	41,634	3,444	8.27	122,187
November	40,405	2,750	6.81	134,013
December	43,211	3,420	7.94	101,638

NOTE.—Poison consisted of mixtures of rolled barley, rice, or wheat mixed with corn oil, plus 10 percent by weight of powdered arsenic, and wrapped in waxed paper.

During the period January 1 to May 31, 1935, experiments were carried out with wheat treated with thallium sulphate in two trapping districts, the results of which are shown in table 7. The same control district was used as that used in the previous experiment, but in this case a certain amount of rat harborage elimination and food elimination work, the procedure of which is explained later, was carried out in

this district in conjunction with the trapping. The thallium sulphate treated wheat failed to bring down the rat catch, as shown in table 7. However, there was a continued gradual and marked drop in the catch in the control district from month to month as a result of the combined effects of trapping and rat harborage elimination work. The results of this work in the control district are shown in figure 2.

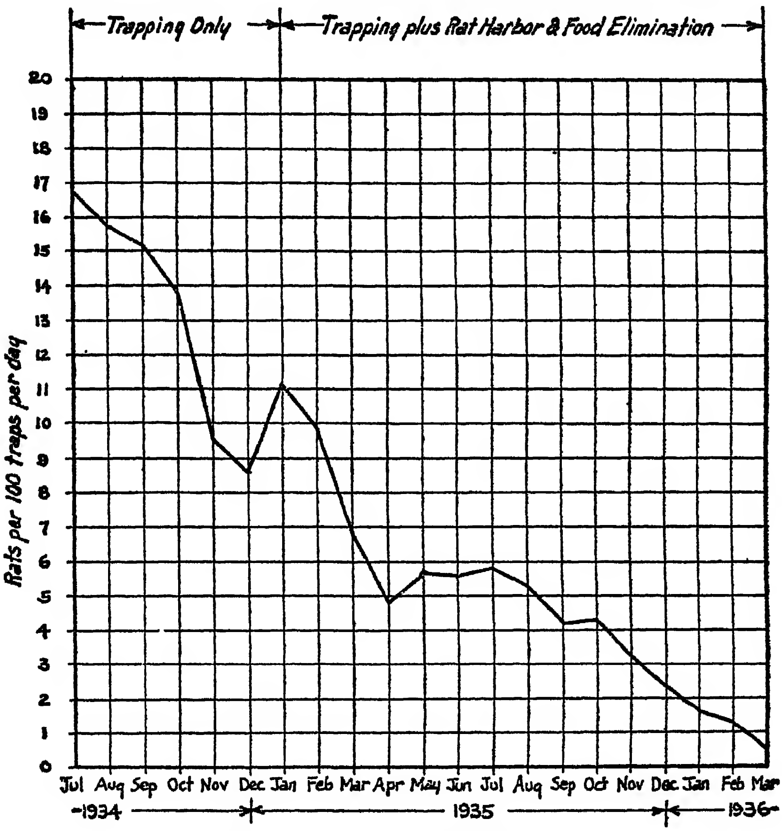


FIGURE 2.—Rate of rat catch in poison-control district (200 traps set daily).

TABLE 7.—*Rate of rat catch in the towns of Wailuku and Haiku, before, during, and after placing poison*

Month	Rat-trap days	Number of rats caught	Rats per 100 traps per day	Packages of poison placed
1934				
December	12,156	871	7.16	0
1935				
January	11,813	832	7.04	46,842
February	10,765	981	9.11	40,814
March	12,325	835	6.78	30,000
April	11,749	1,100	9.36	30,100
May	12,279	995	8.10	0

NOTE.—Poison consisted of thallium sulphate treated wheat (4 pounds of thallium sulphate per 1,000 pounds of grain).

The conclusion was drawn from the experiments just described that, as a major eradicative measure, poison of the character in use could not be expected to be of any particular value in a campaign of this kind. It was believed that it might be of some value as an adjunct to a program of eliminating rat harborage and food elimination and trapping if applied at a time when the rat's normal living conditions and normal supply of food had been disturbed.

PRELIMINARY WORK

One of the first steps made when the work was taken over was the building up of the trapping force and the appointment of a foreman trapper to supervise the work. In October 1933 there were 5 trappers who made a total catch of 1,080 rats during the month. By August 1934 the trapping force had been increased to 15 trappers and one foreman at the expense of a certain amount of poison, and the catch for that month was 6,168 rats. At the time of this report there are 20 districts with a foreman and one subforeman, and 200 traps are used in each district.

In view of the fact that the field rat *R. hawaiiensis* far outnumbered the other two species, and since the supply of rats in the gulches and old pineapple fields seemed to be inexhaustible, with reference to trapping, a number of laborers were obtained from the local Federal Emergency Relief Administration in October 1934 to clear some of the gulches and fields which, according to the trappers' reports, were heavily infested. After clearing these areas, numerous rat burrows could be detected in the ground which could not be located before clearing on account of dense brush. As many as 2,300 burrows were found per acre of cleared land. A number of excavations were made of these burrows, from which it was found that the length of the main tunnel varied from 5 to 18 feet, the diameter from 1½ to 2 inches, and the depth below ground level from 6 inches to 3½ feet. Tunnels encountered had from one to seven burrows or openings and often had laterals at different levels. There were from one to four nests per tunnel system, usually located at dead ends and at elevations above the main tunnel.

As many as 13 rats were found in one tunnel system, and all 3 species were found, the native *hawaiiensis* far outnumbering the other 2 species. In a few cases all three species were found in the same tunnel, but in these cases the rats may have sought temporary shelter after natural living conditions had been disturbed. On the other hand, there is the possibility, as previously stated, that the *alexandrinus* and *rattus* were preying upon the smaller *hawaiiensis*.

Attempts were first made to force the rats out of the burrows and bring them to the laboratory for examination, but the only successful method found of accomplishing this was by filling the tunnel rapidly

with water. Other substances tried were carbon bisulphide, ammonia gas, illuminating gas, a disinfecting gas called Firekill, smoke from bellows, and firecrackers. In cases where only *hawaiiensis* were encountered, a large percentage of the rats died in the burrow from the effects of any of the substances just mentioned. This was not true, however, of *alexandrinus* and *rattus*, as rats of these two species almost invariably escaped from an opening other than the one being treated.

The use of water to drive the rats out was impracticable on a large scale as it frequently required 25 gallons of water to fill one tunnel. Furthermore, on account of the porosity of the soil it was necessary to have a high rate of discharge from the container, which was accomplished in the experiments by emptying a number of pails rapidly. A tank on a truck with one-inch hose was tried, but the rate of flow was not high enough.

Carbon bisulphide was then tried by applying a few drops to each burrow within a radius of about 5 feet and igniting it by throwing a lighted match on one burrow. When the proper amount of carbon bisulpide was applied, there resulted an explosion and flame throughout the tunnel system which killed all species of rats, and those burrows that were connected could be located by the emanation of yellowish fumes.

Later, a calcium cyanide dust pump was obtained and tried out. It was found that, on account of the porous condition of the soil, much of the dust was apparently absorbed in the surrounding ground and did not reach all parts of the tunnel. Also, where the earth was extremely dry, the gas was apparently not developed fast enough to penetrate all parts of the tunnel In one case where one burrow leading into a tunnel system was being treated with this dust a rat escaped from another opening. In another case a rat ran into a dead end branch and was alive and unaffected when recovered by excavation.

Solidified carbon dioxide, commonly known as dry ice, was also tried out later, but failed to kill any rats, probably owing to the fact that it did not turn into gas rapidly enough to produce a sufficiently high concentration throughout the tunnel, and on account of the porous condition of the soil a great deal of the gas was absorbed in the surrounding ground. Rats were recovered alive and unaffected in practically all experiments with this material.

MEASURES ADOPTED

It was obvious that, if permanent results were to be expected, it would be necessary actually to eliminate rat harborages in the plague zone, both those in the ground and above, and it appeared from the

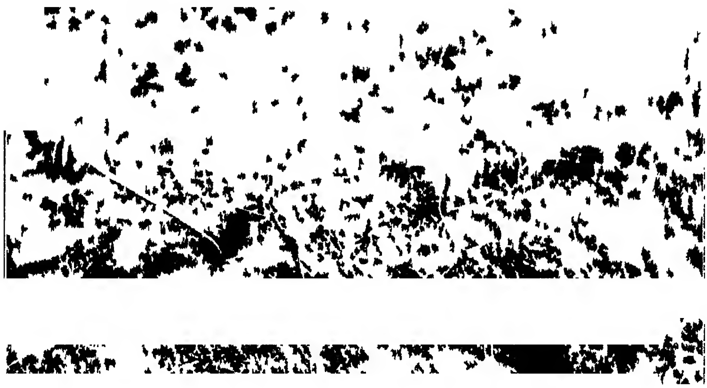
history of the disease that it would be necessary to make the infected zone and surrounding area practically rat-free before it could be considered plague-free.

In October 1934, three plague-infected rats had been found in a gulch which, after clearing, was found to be porous with rat burrows. The trapper could continue to catch the same number of rats day after day in this gulch without moving the traps, and there was abundant evidence of rat-eaten wild fruit and seeds. Work of clearing this gulch and later of firing burrows in the poison-control district, using carbon bisulphide, seemed to have a marked effect on the trappers' catches in those sections. However, from a survey in the field it appeared that it would be much too great a task to attempt to clear all of the gulches and other waste land systematically, even if activities were confined to the region where plague-infected rats had been found up to that time. Consequently, it was decided to use the daily reports of the trappers and work on those areas where large numbers of rats were being caught regularly. In this way the trapper was obliged to shift his traps when an area was to be cleared, until eventually the rat harborages in his district would be eliminated. Thus the trapper would automatically furnish information concerning the areas to be worked and no time would be wasted by clearing areas not infested. The Federal Emergency Relief Administration was appealed to for additional men and the work was begun on a fairly intensive scale in March 1935. At that time the treatment of rat burrows was still in the experimental stage; intensive work of this nature was not carried out generally until May.

The clearing of rat-infested areas consisted simply of cutting out the brush and piling it in rows or piles to dry, and later burning it. In the case of pineapple fields, the fields were first burned to expose the burrows and the stumps were later either pulled up and allowed to decay or were plowed into the soil. In the treatment of burrows, the procedure of applying carbon bisulphide and then igniting it proved so successful and inexpensive that efforts were concentrated on this method. Carbon bisulphide could be purchased for $1.10 per gallon delivered on Maui in 50-gallon drums, and at a slightly higher price in smaller containers; and after a little practice, using a pint oil can with long spout for applying it, 1 gallon was found to be sufficient for treating about 800 burrows. The men became rapidly efficient in this work and found that better results could be obtained by using a few drops in a burrow than by using larger quantities. No attempt was made to recover rats from burrows, and in each case the openings were plugged with earth and well tamped. From numerous excavations made after treating the burrows with carbon bisulphide and firing, only dead rats were recovered.

GULCH IN PLAGUE ZONE BEFORE CLEARING

CLEARED GULCH SHOWING BRUSH PILED IN ROWS ALONG SLOPES FOR BURNING BURNED MATERIAL IS RAKED TO THE BOTTOM OF THE GULCH



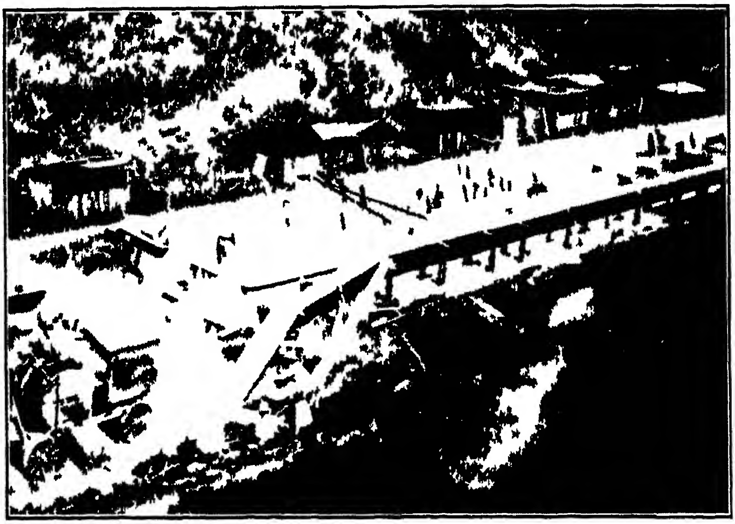
APPLYING CARBON BISULPHIDE TO RAT BURROWS

EXCAVATED TUNNEL SYSTEM THERE WERE 6 OUTLETS TO THIS SYSTEM

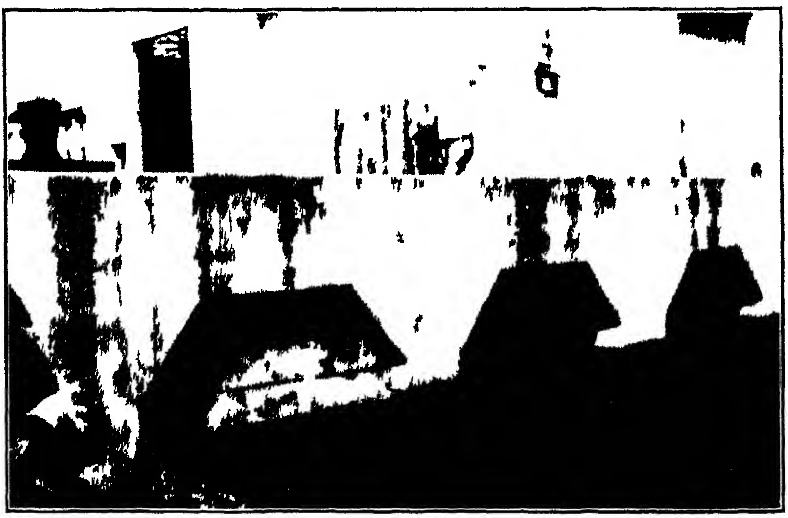
RAT NEST IN ALGAROBA TREE

OLD PINEAPPLE FIELD OVERGROWN WITH WEEDS

WORKERS CLEARING DENSE GROWTH OF CACTUS



CONCRETE RATPROOF PIGPEN APARTMENTS BEING BUILT BY PLANTATION THESE ARE RENTED TO EMPLOYEES AT A NOMINAL CHARGE PER STALL PER MONTH NOTE OLD MAKESHIFT PENS IN THE BACKGROUND



ARCH FILLED IN WITH CONCRETE AT SHORE END OF PIER TO PREVENT RATS FROM GETTING UNDER PIER AND SHED FLOOR

Immediately after the land had been cleared, a practice was made of distributing, in moderate amounts, packages of wheat treated with thallium sulphate, assuming that at such a time, when the rat's food supply had been cut down and the harborages had been exposed, there would be some likelihood of poisoning a certain number of rats. At such times the rats could often be seen running through the cut brush during the day and some were found dead which, upon examination in the laboratory, appeared to have been poisoned. Every effort was made, while the men were clearing, to kill as many rats as possible and all means possible were employed, including the use of clubs. All workers were instructed to look for dead rats, and in some sections one man was assigned to the job of walking around the area as it was being cleared and looking for dead rats. These procedures resulted in picking up five plague-infected rats in the plague zone from two foci. In one of these cases, the first plague-infected rat was picked up within 2 hours after clearing had begun in a certain gulch and two others were found before the work in the gulch was completed, which required about 6 weeks. In another case, the first plague-infected rat was found on the third day of the work and the second on the fourth day, and both rats were taken from the same focus where, according to the records, three plague rats had been found 3-years previously.

Owing to the fact that it was impracticable to attempt to recover rats from the burrows, any plague-infected rats in the burrows were obviously not located. It appears probable that a fairly large number of plague rats were killed in burrows. It is significant to note that of the six plague-infected rats found as a result of work in the gulches and fields, five were of the species *hawaiiensis*, whereas practically all of the earlier plague was found in the other two species.

TABLE 8.—*Rate of rat catch in the plague zone during 13 months in which rat harborage and food elimination work was carried out*

Month	Rat harborage and food elimination	Rat-trap days	Number of rats caught	Rats per 100 traps per day
1935	*Man-hours*			
March	8,593	36,528	3,071	8.41
April	5,244	36,875	2,495	6.76
May	10,866	37,094	2,664	7.18
June	7,616	35,909	2,280	6.34
July	8,622	37,020	2,375	6.41
August	13,048	37,102	1,742	4.69
September	16,381	34,666	1,061	3.06
October	20,295	36,883	1,059	2.87
November	11,197	35,921	971	2.71
December	15,697	37,170	752	2.02
1936				
January	8,986	37,166	637	1.72
February	10,155	34,740	361	1.04
March	6,981	37,070	248	0.67

NOTE.—During the above period 180,000 burrows were treated with carbon bisulphide and sealed and an average of 10,000 packages of poison per month were placed in conjunction with the rat harborage elimination work.

Results of the rat harborage elimination work, judged by the rate of rat catch from month to month, are shown in table 8. Figures are given for the six plague zone districts, where enough work of this nature has been done to show what is being accomplished. It will be noted that in a period of 13 months ending March 31, 1936, the average rate of rat catch for these districts as a whole was gradually reduced from 8 41 rats per 100 traps per day to 0.67 rats per 100 traps per day. The figure is now so low that it is proposed to reduce the

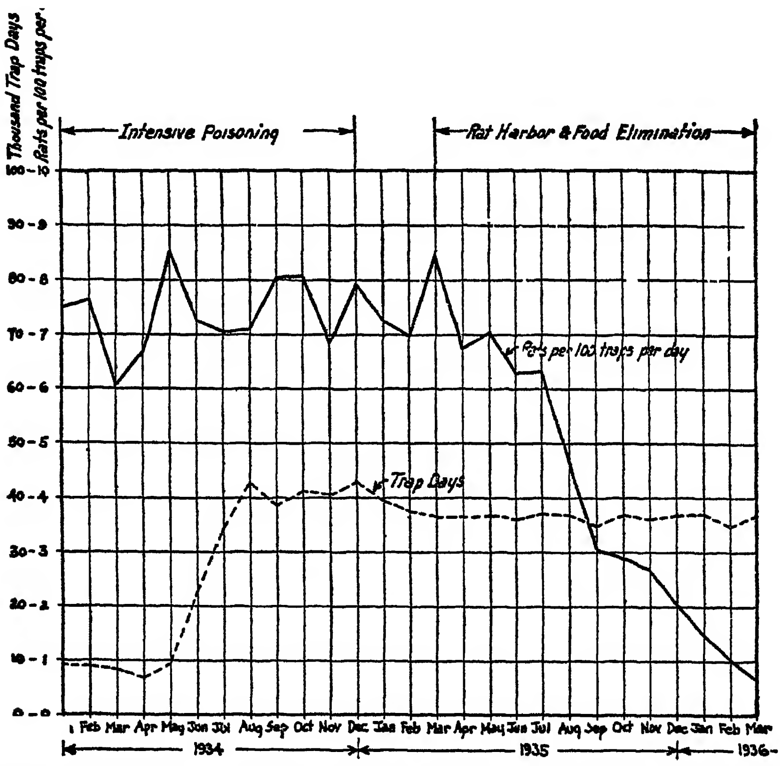


FIGURE 3 —Effect of elimination of food and harborage as compared with poisoning—plague zone and adjacent areas

number of traps in the plague zone by consolidating some of the districts and to attempt to widen this practically rat-free zone by adding new districts in areas bordering the zone. During these 13 months over 2,600 acres of heavily rat-infested fields and gulches were cleared and approximately 180,000 burrows were treated and sealed.

Figure 3 shows graphically the effect on the rat catch of rat harborage and food elimination work in the plague zone and adjacent areas, as compared with a previous period when only intensive poisoning was carried out.

SPECIAL PROBLEMS

One important factor in the plague-eradicative work on this island has been the determination of effective measures for controlling rat harborages in rock piles and rock fences, particularly in the vicinity of buildings, where some food is always available. There is a great deal of volcanic and other rock in practically all parts of the island, and in clearing fields for cultivation it has been necessary to remove the rock; in most cases it has been either piled up in various places or used to build rock walls or fences. In traveling through central Maui these rock piles and walls are common sights and can be seen in cane, pineapple, and other fields, the location having been determined by the shortest haul. They are favorite places for setting traps when near any kind of a food supply, as they offer excellent protection to the rat.

The removal of all of this rock from the plague zone was not practicable on account of economic considerations. It was believed essential, however, to remove it from the immediate vicinity of some of the camps in the Paia region, and this was done. Over 25,000 tons of rock were removed from these camps and taken to an uninhabited location along a railroad right-of-way, where it is proposed to pick it up later and crush it for building purposes. This work was simplified by using a cane loader and laying a portable railroad track into the camps. In all other sections it was decided to treat the rock piles and walls about once a month with calcium cyanide dust; and although no dead rats have ever been recovered by this treatment, the trappers find that they are unable to traps rats at these places for some time after treatment, even where some were trapped regularly just prior to treatment.

The apparent success of the cyanide treatment of rock piles and walls compared with its failure in the burrows is probably due to the fact that enough moisture is retained in the rock to generate the gas, whereas burrows probably dry out shortly after the covering is removed.

In view of the fact that approximately 72 percent of the population of the island is located in Central Maui, and since a general survey indicated that buildings were far from satisfactory from a ratproof standpoint, it was believed essential to carry on a ratproofing campaign concurrently with the other work. Many of the camps were in excellent condition; others were equally as poor. Two sanitary inspectors were employed to make a survey of buildings and premises in the plague zone and surrounding areas, and complete reports were made on a specially prepared inspection report form and the owner was notified of required corrections on a specially prepared noncompliance form. Good results were generally obtained in the absence of

regulations, owing principally to the fact that most of the property involved was owned by the plantations; but in some instances it was necessary to send out a wrecking crew to remove rat harborages in buildings. Ratproofing regulations have recently been prepared for adoption by the Territorial board of health.

In Paia many camp laborers were raising pigs in close proximity to the camps, and in pens which generally afforded excellent rat harborage and food. This problem was solved when the plantation company built concrete ratproof pigpens and rented stalls to the employees at a nominal sum per month.

Work of ratproofing the piers was carried out by the Territorial Board of Harbor Commissioners. This consisted of filling in the arches between the pier pilings with concrete from the shore outward to such a distance that even at low water it would be impossible for rats to find their way over dry land to the areas under the pier and shed floors.

A part of the work of the inspector which has required considerable time is the checking of shipments of vegetables from the plague region to see that rats are not shipped in bags or boxes of vegetables.

The practice in the past has been to pack or sack the vegetables, particularly cabbages, the day before they are brought in trucks to the port of Kahului for shipment by steamer to Honolulu and elsewhere. In one case a rat was found in a bag of cabbages at the dock, apparently brought down from the farm. Shippers are now required to pack vegetables the same day that they are shipped, thus reducing the possibility of shipping rats in the cargo.

Sanitary inspections are also made of ships and outgoing cargo at the port of Kahului. The quarantine officer of the United States Public Health Service is furnished with a statement in each case showing that all cargo loaded was inspected and, if of rat-attractive or rat-harboring nature, was either found to be free from rat infestation or was deratized prior to loading. Notation is also made regarding the sanitary conditions at the wharf, the distance from the last plague focus found, the means of communication between the focus and the port, and the safeguards adopted with respect to the vessel itself while in port.

The shooting of rats from nests in algaroba trees was found to be effective in reducing the tree population temporarily; but in order to get permanent results it was necessary to clear the forests of underbrush in conjunction with the shooting. This work was carried out systematically by a group of laborers obtained from the Federal Emergency Relief Administration, and the tree population has been practically eliminated.

MISCELLANEOUS

In the laboratory all rats are examined macroscopically, and those that are suspicious for plague are examined microscopically; in addition tissue inoculations are made into guinea pigs or white rats. Material from not more than 10 rats is used for inoculating one animal, and two inoculations are made per day, one using rats from the port of Kahului and the other using rats caught in one of the districts in the Makawao area. Inoculation is made by shaving the belly of the animal until serum is obtained and the material is thoroughly rubbed into the skin by back and forth strokes with a spatula. Inoculated animals that do not die by the end of the seventh day are killed and examined.

During the latter part of 1935 plans were prepared for new office and laboratory buildings and these were completed before the end of the year. Up to that time laboratory work had been conducted in an old frame building which had been abandoned as a jail. The new buildings consist of two units, one of which contains the laboratory and office and the other the animal room, storeroom, and garage. Plans have recently been prepared for an incinerator at the station, and when this is built there will be excellent facilities for carrying on routine laboratory work. The buildings are located in a fenced enclosure in a pasture just outside the limits of the town of Kahului and were paid for out of funds of the quarantine tax fund commission of the Maui Chamber of Commerce.

The cost of the campaign has not been great compared with results obtained. The total amount expended during the calendar year 1935 was approximately $122,000, of which about $55,000 was furnished by the Federal Emergency Relief Administration and over $30,000 by plantations. Approximately 93 percent of the total amount was spent for labor and salaries.

Beginning January 1, 1936, an allotment of $35,000 was made available by the Federal Government for a rat-abatement project on the Island of Maui, which is being spent at the rate of about $3,000 per month and is being used entirely to hire labor. Many of the men paid out of this fund were taken over from the Federal Emergency Relief Administration and placed on a full-time basis. Total expenditures of the plague campaign during the first 3 months of 1936 average $14,000 per month, 35 percent of which was obtained locally and the remainder from the Federal Government. By the end of March, however, the work had progressed to a point where it was possible to begin reducing the force.

After the practically rat-free region in the Makawao area has been widened according to present plans, there should be every reason to believe that the disease has been eradicated. However, from the

standpoint of possible reinfection, it is essential that work of improving sanitary conditions and ratproofing buildings be continued, particularly in Paia and Kahului. It is also important that a complete program be laid out for the town of Wailuku on account of its proximity to Kahului.

ACKNOWLEDGMENTS

The success of this work has been due in large measure to the close cooperation and valuable assistance rendered by Dr. F. E. Trotter, president and executive officer of the Territorial Board of Health, and to Dr. N. E. Wayson, senior surgeon, of the United States Public Health Service, who made confirmatory diagnoses of a number of rodent plague cases and gave freely of his time and valuable advice concerning the work in general.

PARALYTIC AND NONPARALYTIC (PREPARALYTIC) POLIOMYELITIS

Notification has been received from the Commissioner of Public Health of the State of Tennessee that, effective October 20, 1936, the number of cases of the preparalytic type of poliomyelitis, which are included in the total reported for that disease, will be stated in each weekly report.

The Public Health Service believes that this is a commendable step.

The cases of preparalytic, or nonparalytic, poliomyelitis are nonfatal cases of poliomyelitis which have not shown definite local muscular weakness. On account of variability and uncertainty in the recognition of these cases, it is believed that for recording and comparing the intensity of spread of poliomyelitis only paralytic cases should be counted, and where such a distinction is possible this rule will be followed in the PUBLIC HEALTH REPORTS. Any notable number of nonparalytic cases will be reported separately. This action is not intended to minimize the importance of the preparalytic or nonparalytic case from the point of view of the spread of the disease or the necessity for medical care.

Incidentally, the Department of Public Health of Massachusetts instituted this classification in reporting poliomyelitis cases at the beginning of the present year.

COURT DECISIONS ON PUBLIC HEALTH

Damages awarded for injuries resulting from the sale of unwholesome food.—(Ohio Supreme Court; *Great Atlantic & Pacific Tea Co.* v. *Hughes*, 3 N. E. (2d) 415; decided July 15, 1936.) The plaintiff purchased some pork sausage from one of the defendant's retail

stores after being assured that it was strictly fresh. Soon after the purchase she ate some of the sausage after frying it thoroughly. She subsequently became ill, which illness it appeared resulted from the eating of the sausage. In an action for damages against the defendant company, judgment was rendered for the plaintiff. On appeal to the supreme court, this judgment was affirmed. In reference to an Ohio statute prohibiting the sale of "diseased, corrupted, adulterated or unwholesome provisions without making the condition thereof known to the buyer", it was said: "It must be conceded that unwholesomeness is not a quality to be attributed to food just because it 'disagrees' with the person eating it, as the resulting effect is ordinarily stated. The language of the statute contemplates that the unwholesomeness prescribed shall consist of a diseased, corrupted, adulterated, or other condition having the effect of rendering such food deleterious to the health of normal persons generally."

Law prohibiting the sale of "filled milk" held void.—(Nebraska Supreme Court; *Carolene Products Co.* v. *Banning et al.*, 268 N. W. 313; decided July 8, 1936.) A law of Nebraska prohibited the sale or exchange of any "milk, cream, skim milk, buttermilk, condensed or evaporated milk, powdered milk, condensed skim milk, or any of the fluid derivatives of any of them, to which has been added any fat or oil other than milk fat, either under the name of said products or articles or the derivatives thereof or under any fictitious or trade name whatsoever." An action was brought by the plaintiff, a company engaged in selling "filled milk" products, to secure an injunction to restrain the defendants from enforcing such law. The supreme court, after finding that "filled milk" was a nutritious and healthful food and in no way deleterious to health in its ordinary use, held the law to be "unreasonable and arbitrary and violative of the fourteenth amendment of the United States Constitution and of section 3, art. 1, of the Constitution of Nebraska."

DEATHS DURING WEEK ENDED OCTOBER 17, 1936

[From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 17, 1936	Corresponding week 1935
Data from 86 large cities of the United States		
Total deaths	7,798	7,866
Deaths per 1,000 population, annual basis	10.9	11.0
Deaths under 1 year of age	556	497
Deaths under 1 year of age per 1,000 estimated live births	50	45
Deaths per 1,000 population, annual basis, first 42 weeks of year	12.1	11.4
Data from industrial insurance companies		
Policies in force	68,617,638	67,793,476
Number of death claims	9,933	11,498
Death claims per 1,000 policies in force, annual rate	7.6	8.8
Death claims per 1,000 policies, first 42 weeks of year, annual rate	9.8	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Oct. 24, 1936, and Oct. 26, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 24, 1936, and Oct. 26, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935
New England States:								
Maine	6				14	45	0	0
New Hampshire	1						1	0
Vermont		3				32	0	0
Massachusetts	3	11			47	53	4	5
Rhode Island					96	4	0	0
Connecticut	2	6			8	58	0	0
Middle Atlantic States:								
New York	14	34	[1] 7	[1] 7	52	234	7	6
New Jersey	20	20	7	3	41	23	2	0
Pennsylvania	23	49			29	53	6	4
East North Central States:								
Ohio	34	95	8	9	5	58	5	3
Indiana	35	99	10	27	2	6	3	8
Illinois	82	84	6	16	17	20	3	5
Michigan	22	8	2	3	20	22	2	1
Wisconsin	8	5	16	26	19	55	1	1
West North Central States:								
Minnesota	6	6			8	14	1	2
Iowa	4	28		3	5	2	0	2
Missouri	11	93	130	42		26	0	3
North Dakota		7	9			3	0	0
South Dakota		4			1	3	0	0
Nebraska	2	16			2	40	1	0
Kansas	14	12		3	1	3	0	0
South Atlantic States:								
Delaware	5		3		9	56	0	0
Maryland [2]	15	10	4	6	6	7	0	2
District of Columbia	7	18	2	1	8		1	4
Virginia [3]	67	82			4	15	4	4
West Virginia	42	66	11	16	1		1	2
North Carolina [4]	180	124	10	8	13		0	2
South Carolina [3]	14	13	114	185	9	6	0	3
Georgia [3]	32	57					0	0
Florida [3]	20	24	4		2	1	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 24, 1936, and Oct. 26, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935
East South Central States:								
Kentucky	41	74	12	9	93	65	4	0
Tennessee	68	72	88	22	2	2	0	4
Alabama [3]	84	45	20	36		9	2	1
Mississippi [2]	17	36					0	0
West South Central States:								
Arkansas	7	22	6	12		2	0	0
Louisiana	29	28	23	12	1	13	[5] 1	0
Oklahoma [6]	16	25	40	16	1	2	8	2
Texas [3]	27	170	92	153	4	7	0	3
Mountain States:								
Montana	1	4	12	5	2	10	0	0
Idaho		1	8	2	45		1	0
Wyoming	1	1				18	0	0
Colorado	10	18			2	6	2	0
New Mexico	5	7		2	35	8	0	0
Arizona	8	8	22	29	11	2	0	0
Utah [2]		1			8	1	1	0
Pacific States:								
Washington		3			5	88	1	1
Oregon	3	1	26	21	6	108	1	1
California	45	65	30	24	46	137	2	2
Total	926	1,555	672	698	680	1,317	60	66
First 43 weeks of year	20,947	27,581	145,393	108,928	273,979	702,700	6,536	4,793

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935
New England States:								
Maine	0	6	10	22	0	0	2	2
New Hampshire	0	0	0	9	0	0	0	0
Vermont	0	4	3	5	0	0	1	1
Massachusetts	4	35	92	120	0	0	1	2
Rhode Island	0	7	17	12	0	0	1	1
Connecticut	2	9	34	44	0	0	6	1
Middle Atlantic States:								
New York	10	45	237	271	0	0	21	10
New Jersey	1	22	37	68	0	0	4	1
Pennsylvania	4	1	233	291	0	0	20	14
East North Central States:								
Ohio	24	0	139	290	0	2	18	25
Indiana	2	4	94	125	0	3	11	7
Illinois	45	12	192	392	2	5	27	20
Michigan	15	14	154	139	0	0	14	9
Wisconsin	0	1	150	275	0	4	6	4
West North Central States:								
Minnesota	1	0	78	151	3	0	1	3
Iowa	4	1	52	82	2	4	6	10
Missouri	3	1	67	143	0	0	19	16
North Dakota	1	1	16	28	1	0	0	8
South Dakota	0	2	43	42	2	12	0	1
Nebraska	2	0	25	35	2	5	0	0
Kansas	8	1	71	88	0	2	5	5
South Atlantic States:								
Delaware	0	0	4	4	0	0	5	4
Maryland [3]	1	1	52	81	0	0	17	16
District of Columbia	0	3	11	13	[7] 0	0	3	2
Virginia [3]	1	4	41	68	0	0	25	29
West Virginia	7	0	76	173	0	0	17	10
North Carolina [4]	2	3	91	135	1	0	10	8
South Carolina [3]	2	1	14	7	0	0	13	5
Georgia [2]	7	0	31	33	1	0	29	13
Florida [3]	1	1	5	7	0	0	3	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 24, 1936, and Oct. 26, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935	Week ended Oct. 24, 1936	Week ended Oct. 26, 1935
East South Central States:								
Kentucky	9	7	49	77	0	0	27	12
Tennessee	14	1	64	87	0	0	17	13
Alabama [3]	1	1	27	14	0	0	4	11
Mississippi [2]	2	0	19	16	0	1	9	6
West South Central States:								
Arkansas	4	0	7	18	0	0	5	4
Louisiana	0	8	15	14	0	1	15	33
Oklahoma [6]	2	0	5	21	0	0	13	18
Texas [3]	4	8	22	78	1	0	13	32
Mountain States:								
Montana	0	0	140	52	19	10	6	1
Idaho	0	0	41	20	2	0	8	1
Wyoming	0	0	12	14	1	0	2	0
Colorado	0	0	27	107	1	0	0	8
New Mexico	1	0	20	6	0	0	32	33
Arizona	0	0	15	11	0	0	0	2
Utah [2]	0	1	12	52	0	0	0	0
Pacific States:								
Washington	3	5	34	41	0	31	3	6
Oregon	2	2	25	30	0	0	4	4
California	8	21	153	190	0	0	12	14
Total	197	223	2,756	4,001	38	80	455	420
First 43 weeks of year	8,555	9,838	198,703	202,863	6,425	5,686	12,305	15,351

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever cases, week ended Oct. 24, 1936, 44 cases, as follows: Virginia, 1; South Carolina, 6; Georgia, 22; Florida, 1; Alabama, 8; Texas, 6.
[4] Rocky Mountain spotted fever, week ended Oct. 24, 1936, North Carolina, 1 case.
[5] Delayed report.
[6] Exclusive of Oklahoma City and Tulsa.
[7] Report of 4 cases of smallpox in the District of Columbia, PUBLIC HEALTH REPORTS, Oct. 16, 1936, p. 1448, was an error, no cases of smallpox having occurred.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September 1936										
Arizona	1	12	72	4	14	2	2	10	0	7
Florida	4	88	5	78	4		12	16	0	13
Illinois	14	86	18	22	85		240	388	16	111
Kansas	1	29	3	3	8		21	119	1	20
Louisiana	4	58	47	199	4	4	8	18	0	107
Mississippi	1	90	640	7,897	49	342	28	39		96
New York	24	62		8	195		49	460	0	85
Oklahoma [1]	6	27	46	110	1	12	4	23	2	60
Oregon	2	3	82	17	12		10	48	2	18
Rhode Island	1	1			9		0	53	0	10
South Dakota		1	10		17		4	47	0	12
Tennessee	18	132	31	341	11	20	80	109	0	136
Texas	6	125	94	3,098	27	13	9	85	1	107
Vermont					9		0	10	0	2
Washington	1	5	9		81		28	85	7	20
Wisconsin	6	18	60		73		20	390	3	9

[1] Exclusive of Oklahoma City and Tulsa.

Summary of monthly reports from States—Continued

September 1936

	Cases
Chicken pox:	
Arizona	15
Florida	3
Illinois	81
Kansas	9
Mississippi	92
New York	221
Oklahoma [1]	1
Oregon	17
Rhode Island	13
South Dakota	9
Tennessee	13
Texas	14
Vermont	17
Washington	101
Wisconsin	235
Dengue:	
Florida	7
Mississippi	6
Dysentery:	
Arizona	24
Florida (bacillary)	4
Illinois (amoebic)	9
Illinois (amoebic carriers)	24
Illinois (bacillary)	29
Kansas (bacillary)	6
Louisiana (amoebic)	17
Louisiana (bacillary)	1
Mississippi (amoebic)	59
Mississippi (bacillary)	647
New York (amoebic)	6
New York (bacillary)	78
Oklahoma [1]	15
Tennessee (amoebic)	3
Tennessee (bacillary)	42
Texas (bacillary)	40
Washington (amoebic)	1
Washington (bacillary)	7
Epidemic encephalitis:	
Arizona	1
Illinois	11
Kansas	2
New York	6
Rhode Island	1
Washington	2
Favus:	
Illinois	1
German measles:	
Arizona	6
Illinois	20
New York	34
Rhode Island	11
Tennessee	1
Washington	11
Wisconsin	28
Hookworm disease:	
Louisiana	6
Mississippi	210
Impetigo contagiosa:	
Kansas	2
Oklahoma [1]	1
Oregon	96
Tennessee	16
Washington	1

September 1936—Continued

	Cases
Lead poisoning:	
Illinois	7
Leprosy:	
Arizona	1
Mumps:	
Arizona	17
Florida	30
Illinois	86
Kansas	46
Louisiana	8
Mississippi	210
Oklahoma [1]	2
Oregon	27
Rhode Island	16
South Dakota	16
Tennessee	15
Texas	74
Vermont	21
Washington	51
Wisconsin	192
Ophthalmia neonatorum:	
Illinois	3
New York	7
Oklahoma [1]	1
Wisconsin	2
Paratyphoid fever:	
Florida	1
Illinois	5
Louisiana	1
New York	9
Oregon	1
Tennessee	2
Texas	13
Washington	1
Puerperal septicemia:	
Mississippi	18
Washington	2
Rabies in animals:	
Illinois	33
Louisiana	27
Mississippi	14
New York [2]	2
Washington	6
Rabies in man:	
Illinois	3
Rocky Mountain spotted fever:	
Illinois	1
Scabies:	
Kansas	1
Oregon	62
Tennessee	3
Washington	5
Septic sore throat:	
Illinois	1
Kansas	1
Louisiana	3
New York	27
Oklahoma [1]	19
Rhode Island	2
Tennessee	7
Washington	1
Wisconsin	2

September 1936—Continued

	Cases
Tetanus:	
Illinois	6
Kansas	1
Louisiana	2
New York	7
Oklahoma [1]	2
Tennessee	2
Trachoma:	
Arizona	26
Illinois	185
Mississippi	5
Oklahoma [1]	16
South Dakota	1
Tennessee	53
Trichinosis:	
Illinois	3
New York	11
Tularaemia:	
Illinois	2
Louisiana	1
Tennessee	2
Texas	1
Wisconsin	1
Typhus fever:	
Florida	11
Louisiana	1
New York	1
Tennessee	1
Texas	42
Undulant fever:	
Arizona	4
Florida	2
Illinois	7
Kansas	5
Louisiana	5
New York	17
Oklahoma [1]	6
Rhode Island	1
Tennessee	8
Texas	5
Vermont	8
Washington	2
Wisconsin	14
Vincent's infection:	
Illinois	16
Kansas	9
New York [2]	53
Oregon	13
Tennessee	9
Whooping cough:	
Arizona	10
Florida	17
Illinois	524
Kansas	41
Louisiana	7
Mississippi	169
New York	1,059
Oklahoma [1]	4
Oregon	62
Rhode Island	75
South Dakota	4
Tennessee	14
Texas	48
Vermont	107
Washington	69
Wisconsin	552

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 17, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	1	0	0	0	0	0	24
New Hampshire:											
Concord	0	------	0	0	2	0	0	1	0	0	18
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	0	9
Rutland	0	------	0	0	1	0	0	0	0	0	7
Massachusetts:											
Boston	1	------	0	2	20	20	0	12	0	73	221
Fall River	0	------	0	0	0	1	0	1	0	0	40
Springfield	0	------	0	0	0	8	0	0	0	2	20
Worcester	0	------	0	7	5	3	0	2	0	13	49
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	9
Providence	0	------	0	0	8	12	0	1	0	16	58
Connecticut:											
Bridgeport	1	------	0	6	1	0	0	0	1	0	27
Hartford	0	------	0	0	3	5	0	1	0	3	36
New Haven	0	1	1	0	1	0	0	0	0	2	34
New York:											
Buffalo	0	------	0	2	7	18	0	4	0	12	128
New York	11	13	5	28	84	39	0	78	22	73	1,339
Rochester	0	------	0	0	2	1	0	0	1	2	58
Syracuse	0	------	0	0	1	4	0	0	0	15	30
New Jersey:											
Camden	2	------	1	0	1	1	0	2	0	4	34
Newark	1	1	0	1	2	0	0	6	0	14	79
Trenton	0	------	0	0	2	4	0	1	0	0	34
Pennsylvania:											
Philadelphia	2	------	1	3	17	32	0	11	7	97	419
Pittsburgh	3	------	------	------	22	39	0	6	2	16	159
Reading	0	------	1	0	0	4	0	2	0	10	17
Scranton	0	------	------	1	------	2	0	------	0	3	------
Ohio:											
Cincinnati	10	------	2	0	9	10	0	6	0	2	116
Cleveland	3	3	0	0	14	22	0	10	1	20	183
Columbus	3	------	0	0	1	9	0	2	0	1	64
Toledo	0	------	0	0	1	4	0	5	0	15	73
Indiana:											
Anderson	0	------	1	0	3	0	0	0	0	1	12
Fort Wayne	0	------	0	0	4	1	0	0	0	0	22
Indianapolis	2	------	0	0	7	8	0	4	0	4	116
Muncie	1	------	0	0	0	1	0	0	0	0	9
South Bend	0	------	0	0	1	1	0	0	0	6	19
Terre Haute	0	------	0	0	0	4	0	0	0	0	14
Illinois:											
Alton	0	------	0	0	1	4	0	0	0	0	6
Chicago	5	4	1	7	43	60	0	33	3	53	683
Elgin	1	------	0	0	0	0	0	0	0	3	8
Moline	0	------	0	0	0	0	0	0	0	0	5
Springfield	0	------	0	0	1	1	0	0	0	1	20
Michigan:											
Detroit	6	1	1	2	22	40	0	23	0	86	260
Flint	0	------	0	2	3	5	0	0	0	2	16
Grand Rapids	0	------	0	1	1	12	0	0	0	5	32
Wisconsin:											
Kenosha	0	------	0	1	0	4	0	0	0	1	5
Madison	0	------	0	0	0	2	0	0	0	2	21
Milwaukee	1	1	1	2	3	18	0	3	0	34	82
Racine	0	------	0	0	0	1	0	0	0	1	5
Superior	0	------	0	0	0	2	0	0	0	11	4
Minnesota:											
Duluth	0	------	0	2	0	3	0	2	0	0	17
Minneapolis	8	------	1	0	4	7	0	1	0	10	94
St. Paul	0	------	0	3	7	3	0	0	0	3	63
Iowa:											
Cedar Rapids	0	------	------	0	------	2	0	------	0	0	------
Davenport	0	------	------	0	------	1	0	------	0	0	------
Des Moines	0	------	------	0	------	5	0	------	0	0	23
Sioux City	0	------	------	0	------	3	0	------	0	0	------
Waterloo	1	------	------	0	------	4	0	------	0	11	------

City reports for week ended Oct. 17, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Missouri:											
Kansas City	2	------	0	0	9	13	0	6	0	0	94
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	6	1	1	0	6	11	0	14	3	8	208
North Dakota:											
Fargo	0	------	0	0	0	0	0	0	0	0	3
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	1	0	0	0	0	8
South Dakota:											
Aberdeen	0	------	------	1	------	5	0	------	0	0	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	10
Nebraska:											
Omaha	1	------	0	0	1	8	0	0	0	0	49
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	9
Topeka	0	------	0	0	1	1	0	0	0	0	20
Wichita	0	------	0	0	7	11	0	0	0	1	30
Delaware:											
Wilmington	0	------	0	0	3	0	0	0	1	1	33
Maryland:											
Baltimore	2	1	0	1	16	10	0	16	0	75	185
Cumberland	0	1	1	1	0	3	0	1	0	0	20
Frederick	0	------	0	0	1	0	0	0	0	0	6
District of Col.:											
Washington	11	------	0	3	14	6	0	14	2	23	108
Virginia:											
Lynchburg	3	------	0	1	0	1	0	0	0	0	8
Norfolk	2	5	0	0	4	1	0	1	0	0	27
Richmond	0	------	2	0	8	2	0	3	0	0	61
Roanoke	0	------	0	0	1	0	0	2	0	0	22
West Virginia:											
Charleston	2	------	0	0	6	1	0	0	1	0	32
Huntington	8	------	------	0	------	3	0	------	0	0	------
Wheeling	0	------	0	0	0	0	0	1	0	1	12
North Carolina:											
Gastonia	2	------	------	0	------	2	0	------	0	0	------
Raleigh	------	------	------	------	------	------	------	------	------	------	------
Wilmington	4	------	0	0	0	1	0	1	1	0	11
Winston-Salem	0	------	0	1	1	1	0	0	0	1	21
South Carolina:											
Charleston	0	5	0	0	9	1	0	3	1	1	22
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	1	0	0	1	0	0	15
Greenville	1	------	0	0	1	1	0	0	0	0	13
Georgia:											
Atlanta	9	7	1	0	5	5	0	4	0	0	95
Brunswick	0	------	0	0	1	0	0	0	0	0	7
Savannah	3	3	0	0	0	2	0	2	0	4	28
Florida:											
Miami	0	------	3	0	2	0	0	1	0	0	38
Tampa	4	------	0	1	1	1	0	0	0	8	12
Kentucky:											
Ashland	1	------	------	0	------	3	0	------	0	0	------
Covington	0	------	0	0	1	1	0	3	0	0	24
Lexington	0	------	0	0	1	0	0	1	0	0	21
Louisville	0	------	0	0	5	6	0	2	0	30	56
Tennessee:											
Knoxville	3	------	0	1	1	2	0	0	1	0	29
Memphis	3	------	1	0	4	9	0	4	1	4	62
Nashville	2	------	0	0	8	2	0	5	0	0	59
Alabama:											
Birmingham	3	2	0	1	7	3	0	3	1	4	69
Mobile	2	1	0	0	1	0	0	1	0	0	21
Montgomery	1	------	------	0	------	2	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	0	0	0	------	0	0	------
Little Rock	0	------	0	0	4	0	0	4	0	0	8
Louisiana:											
Lake Charles	0	------	0	0	2	0	0	0	0	0	4
New Orleans	0	1	1	0	8	0	0	4	0	1	153
Shreveport	0	------	0	0	2	0	0	6	0	0	41
Oklahoma:											
Oklahoma City	6	------	0	0	3	2	0	1	0	0	35
Tulsa	0	------	------	0	------	2	0	------	1	0	------

City reports for week ended Oct. 17, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	2	1	1	0	6	3	0	1	2	4	62
Fort Worth	1	------	0	3	4	0	0	0	0	0	32
Galveston	0	------	0	0	1	0	0	2	0	0	18
Houston	1	------	0	0	5	3	0	4	0	1	70
San Antonio	0	------	1	0	4	0	0	4	0	0	52
Montana:											
Billings	1	------	0	0	0	0	0	0	0	0	7
Great Falls	0	------	0	1	0	1	1	0	0	0	7
Helena	0	------	0	0	0	0	0	0	0	0	6
Missoula	0	------	0	0	2	1	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	1	0	0	0	0	0	11
Colorado:											
Colorado Springs	0	------	0	0	1	1	0	0	0	0	12
Denver	4	------	1	2	6	5	0	3	0	33	86
Pueblo	1	------	0	0	0	4	0	1	0	0	12
New Mexico:											
Albuquerque	2	------	0	0	0	1	0	3	0	0	8
Utah:											
Salt Lake City	0	------	0	0	2	8	0	0	0	1	47
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	1	1	9	3	0	1	0	0	84
Spokane	0	2	2	1	4	21	0	2	0	0	37
Tacoma	0	------	0	0	1	1	0	0	0	0	29
Oregon:											
Portland	2	------	0	0	2	4	0	0	0	1	70
Salem	0	------	------	0	------	1	0	------	0	5	------
California:											
Los Angeles	19	7	1	3	11	12	0	25	0	89	312
Sacramento	3	------	0	2	1	16	0	2	1	6	23
San Francisco	1	------	0	0	8	13	0	7	0	18	145

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
New Hampshire:			
Concord	0	0	1
Massachusetts:			
Boston	0	0	1
Rhode Island:			
Providence	1	0	0
New York:			
Buffalo	2	1	0
New York	4	3	3
Rochester	0	0	1
Syracuse	0	0	1
Pennsylvania:			
Philadelphia	1	0	0
Ohio:			
Cincinnati	3	1	0
Cleveland	0	0	1
Toledo	1	0	5
Illinois:			
Chicago	1	0	18
Elgin	0	0	2
Michigan:			
Detroit	1	0	4
Minnesota:			
Minneapolis	3	0	2
Iowa:			
Davenport	0	0	1
Des Moines	0	0	1
Missouri:			
St. Louis	1	0	3

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
North Dakota:			
Grand Forks	0	0	1
South Dakota:			
Sioux Falls	1	1	0
Maryland:			
Baltimore	2	0	0
Virginia:			
Richmond	1	0	0
South Carolina:			
Charleston	0	0	1
Kentucky:			
Louisville	1	0	0
Tennessee:			
Knoxville	0	1	2
Memphis	0	0	3
Alabama:			
Birmingham	2	0	1
Oklahoma:			
Oklahoma City	1	0	0
Tulsa	0	0	13
Texas:			
Fort Worth	0	0	1
Colorado:			
Denver	0	0	1
California:			
Los Angeles	0	0	5

Epidemic encephalitis.—Cases: New York, 2; Chicago, 1; Milwaukee, 1; Portland, 1; San Francisco, 1.
Pellagra.—Cases: Boston, 1; Norfolk, 1; Atlanta, 1; Savannah, 1; New Orleans, 3.
Typhus fever.—Cases: Atlanta, 3; Tampa, 1; New Orleans, 1.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—July 1936.—During the month of July 1936 certain communicable diseases were reported in Czechoslovakia as follows:

Diseases	Cases	Deaths	Diseases	Cases	Deaths
Anthrax	8		Paratyphoid fever	21	
Cerebrospinal meningitis	10	5	Poliomyelitis	51	3
Chicken pox	80		Puerperal fever	28	10
Diphtheria	1,395	99	Scarlet fever	1,706	54
Dysentery	141	15	Trachoma	86	
Influenza	11		Typhoid fever	543	37
Lethargic encephalitis	2	2	Typhus fever	4	
Malaria	285				

IRISH FREE STATE

Vital statistics—Second quarter 1936.—The following statistics for the Irish Free State for the quarter ended June 30, 1936, are taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

	Number	Rates per 1,000 population		Number	Rates per 1,000 population
Marriages	3,430	4.6	Deaths from—Continued.		
Births	15,040	20.3	Influenza	193	0.26
Total deaths	10,801	14.6	Measles	71	
Deaths under 1 year of age	1,017	(1)	Puerperal septicemia	33	[2] 2.19
Deaths from—			Scarlet fever	43	
Cancer	841	1.13	Tuberculosis (all forms)	955	1.29
Diarrhea and enteritis (under 2 years of age)	78		Typhoid fever	13	
Diphtheria	94		Typhus fever	1	
Dysentery	1		Whooping cough	44	

[1] Deaths under 1 year of age per 1,000 births, 68.
[2] Per 1,000 births.

99426°—36——3

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for October 30, 1936, pages 1518-1531. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued November 27, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina.—During the period October 1-15, 1936, 1 case of human plague with 1 death was reported in Catamarca Province, and 4 plague infected rats were reported in Buenos Aires, Argentina.

Belgian Congo—Mahagi Territory—Nioka.—On October 21, 1936, 2 suspected cases of plague were reported in Nioka, Mahagi Territory, Belgian Congo.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—Three rats found October 22, 1936, and 1 rat found October 27, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

Peru.—During the month of September 1936, 8 cases of plague, including 2 suspected cases, with 1 death were reported in Peru. Plague-infected rats were also reported present in Callao, Peru, and in the port of Salaverry, Peru.

Typhus Fever

Peru.—During the month of July 1936, 268 cases of typhus fever were reported in Peru.

Yellow Fever

Colombia.—During the period August 29 to September 19, 1936, 3 deaths from yellow fever were reported in Colombia.

Dahomey—Bembereke.—From September 21 to 30, 1936, 1 case of yellow fever with 1 death was reported in Bembereke, Dahomey.

Sudan (French)—Katibougou.—On October 4, 1936, 1 case of yellow fever was reported in Katibougou, Sudan (French).

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UNITED STATES TREASURY DEPARTMENT

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BY THE UNITED STATES PUBLIC HEALTH SERVICE

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

VOL. 51 NOVEMBER 13, 1936 No. 46

THE EFFICIENCY OF RAPID SAND FILTERS IN REMOVING THE CYSTS OF THE AMOEBIC DYSENTERY ORGANISMS FROM WATER [1]

By JOHN R. BAYLIS, *Physical Chemist*, OSCAR GULLANS, *Senior Sanitary Chemist, Division of Water Purification, Department of Public Works, City of Chicago;* and BERTHA KAPLAN SPECTOR, Ph. D., *Associate Protozoologist, United States Public Health Service,* and *Research Associate, Department of Medicine, Douglas Smith Foundation of the University of Chicago.*

Previous experiments [1] on the removal from water of *Endamoeba histolytica* cysts (the cysts of amoebic dysentery) indicated that filtration through rapid sand filters was an effective means of removing such organisms. These earlier tests were run with glass-tube filters, and were on such a small scale that it was thought advisable to conduct a few experiments on a larger scale. Experience with small glass-tube filters on ordinary water filtration indicates that reliable results can be obtained with these filters; yet so few such filters are being used for experimental work that results on a larger scale may be more convincing to many who have not had experience with the glass-tube filters.

The area of the sand surface of the glass-tube filters used in the previous tests was approximately 2.5 square inches, whereas the filter used in the experiments herein given had a sand-surface area of 10 square feet.

In addition to conducting the filtration experiments on a larger scale, a new method of concentrating the cysts in water by passing a large volume of the filtered water through a continuous-flow centrifuge was used. Determination of the number of cysts in water which contains not more than one cyst in 10 gallons of water is not an easy task, though it is believed that this method of concentration gave fairly accurate results.

APPARATUS

The filter used in this series of experiments was one of the small plant filters of the Chicago Experimental Filtration Plant. Figure

[1] This work was conducted at the Chicago Experimental Filtration Plant under the direction of Mr. Arthur E. Gorman, Engineer of Water Purification, Bureau of Engineering, Department of Public Works, City of Chicago, and Dr. G. W. McCoy, Director, National Institute of Health, United States Public Health Service, Washington, D. C.

1 shows a section through the filter and how the filter was connected to receive coagulated water contaminated with *E. histolytica* cysts. Long-time operation of filters of this size has demonstrated that they are suitable for almost any type of filtration experiment.

The water was coagulated in the vertically baffled mixing basin of the experimental plant in a manner typical of ordinary filter-plant operation. A small portion of the water was taken off near the end of the mixing basin through a 3-inch pipe. This pipe had no direct connection to the influent line of the filter used for filtering the cysts.

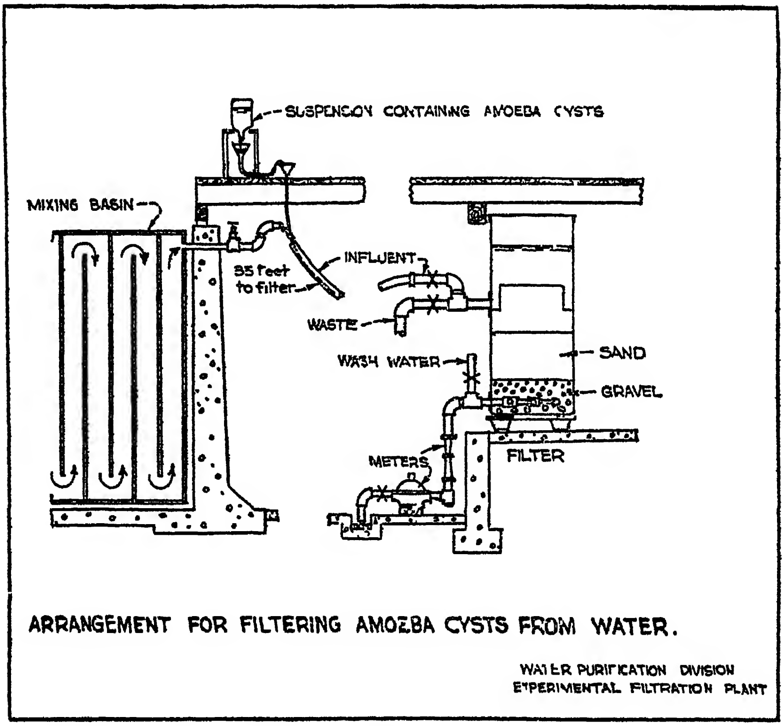

FIGURE 1

The water poured from the outlet of the pipe into a 3-inch rubber hose about 30 feet long, which carried it to the filter. This hose served as a mixing channel for the cysts and mixed them with the coagulated water. There was a free fall of the water of about 6 inches into the hose to insure that water containing cysts would not be drawn back into the mixing basin, should the water level in the mixing basin be lowered. By suspending the end of the hose in a certain position, practically all the water flowing out of the pipe fell into the end of the hose. By regulating the flow so that there was a small overflow from the hose, the level on the filter was kept constant.

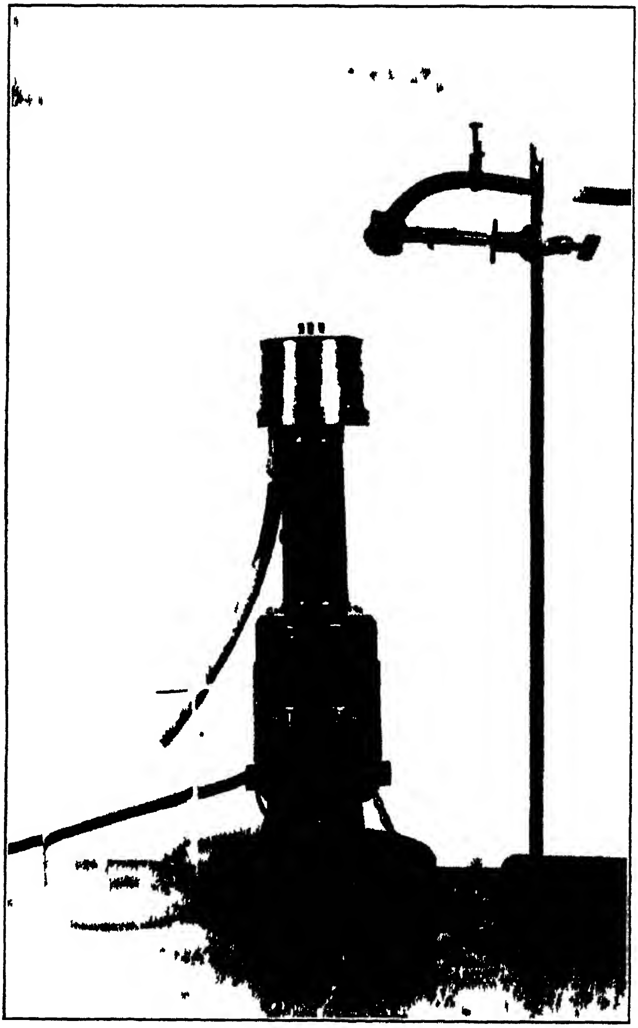

FIGURE 2.—The centrifuge used in the experiments

To feed the solution containing the cysts into the 3-inch hose a small rubber tube leading from a funnel on the floor above was used. This carried the suspension of cysts to a point about 6 feet into the hose. A glass orifice was located in this funnel, and the funnel was connected with a second funnel over which a 5-gallon bottle of water containing a known number of cysts was inverted. The orifice was calibrated to give the desired rate of feed; and as the level of water was maintained almost constant in the funnel underneath the bottle, the flow from the orifice was constant. The arrangement of the bottle and funnels is shown in figure 1.

The bottle was stoppered with a rubber stopper having a glass tube about 8 mm inside diameter passing through the stopper and projecting outward about 3 inches. Over the end of this was a rubber tube about 6 inches long. A screw clamp was used to close the tube so that the solution would not run out in tipping the bottle to place in position. Two bottles were used, one being filled with the suspension of cysts while the other one was in use. A frequent inspection of the 5-gallon bottle in use was all that was necessary to determine the time to replace the bottle with a full one.

The sand was typical of that used extensively in rapid sand filtration; the bed was 24 inches in depth of sand having an effective size of 0.5 mm diameter and a uniformity coefficient of 1.40, according to the Hazen method of determining the size and uniformity coefficient. The bed was maintained in good condition.

The centrifuge used to concentrate the cysts in the filtered water was a continuous-flow type. The machine was developed primarily for concentrating algae and other plankton in water. The efficiency for concentrating such organisms is high. The instrument has a fast revolving cup about 1.5 inches inside diameter, with the diameter being slightly greater at the bottom so that the cup, when in operation, retains continuously about 5 cc of water. Figure 2 is an illustration of the centrifuge.

EXPERIMENTS

The filter (10 sq. ft.) used in these tests was kept in continuous operation throughout the period of about 9 months, in which occasional experiments on filtering the cysts were conducted. The work was purposely spread over a long period so as to have tests for all changes in the lake water. Usually the filter was washed just before starting an experiment on filtering the cysts so that the run would be as long as possible.

A stool containing many *E. histolytica* cysts was thoroughly emulsified with distilled water and strained through two layers of gauze, so that the suspension was uniform. The number of cysts for a given volume of the suspension was determined by examining a small

portion with a microscope. The concentrated suspension was diluted to a definite amount with distilled water, and 1 cc of the diluted portion placed in a Rafter's counting cell and the cysts counted. The dilution should be such that the number of cysts will be between 50 and 200 per cc. In this manner the number of cysts in the concentrated suspension may be determined with fair accuracy, though variations as much as 10 to 20 percent are to be expected.

Having determined the number of cysts in the concentrated suspension, the amount of the suspension to add to the 5-gallon portions of water to produce some certain number in the water going to the filter could be determined. For ease in measuring, a definite number of cubic centimeters of the concentrated suspension were added. After agitating thoroughly the mixture of water and cysts in the 5-gallon bottle, the suspension was ready to be used. In some tests about 20 p. p. m. of aluminum sulphate were added to the water in the bottles partially to coagulate the suspended matter, and in others the suspensions of cysts were not coagulated. There was no difference in the results; that is, in the efficiency of the filter in removing the cysts.

When the 5-gallon bottle was placed in an inverted position over the funnel, the end of the tube which passed through the rubber stopper projected downward to about the center of the funnel. Air enters the bottle as the water flows out, both air and water passing through the same tube in opposite directions. This will continue until the level of the water in the funnel rises to a point where air cannot enter the tube. A sloping end on the tube facilitates starting the action when the water level in the funnel lowers slightly. The variation of the water level in the funnel is not greater than about one-half inch. This keeps a uniform head on the orifice and insures a uniform flow, through the orifice, of cysts suspended in the water. The time required for each 5-gallon portion containing cysts to run out was set at about 60 minutes. With the rate of filtration kept constant, the cysts should be uniformly distributed in the water going to the filter. The air bubbles rising through the water in the bottles each time that air runs into the bottle agitates the water sufficiently to keep the cysts in suspension and distributed uniformly through the water.

This type of experiment differed from natural pollution in that the water was coagulated before the cysts were added, and the coagulated water was not settled before filtration. The water was not very turbid and was coagulated with such a small amount of aluminum sulphate (8 to 17 p. p. m.) that the volume of coagulated matter could be handled by the filter without difficulty. The lengths of filter runs were shorter than they would have been had the water been settled before going to the filter, but experience has shown that coagulated

matter is much more likely to pass through a filter bed when all of the coagulated matter produced by the chemical treatment is applied directly to the filter than when the water passes through settling basins which remove a substantial portion of the coagulated matter. Since much of the filtered water from the experimental plant is used for drinking purposes, it was not advisable to apply the cysts to the water going through the plant settling basins. Had the cysts been added first, the water coagulated, later settled, and then filtered, even better results should have been expected.

The filter was operated at a rate of 2 gallons per square foot per minute. The rate of filtration was controlled by hand, but was kept very close to the desired rate. For the first few tests, enough caustic lime was added to the effluent water from the filter to produce about 25 percent saturation with calcium hydroxide, the samples, of course, being collected before the addition of the lime. The addition of the lime was for the purpose of destroying any cysts which might pass through the filter. After it was demonstrated that almost no cysts were passing the filter, use of the lime was discontinued. Samples of filtered water were collected at equal intervals for testing. The method of concentrating the cysts in the filtered water for examination with the microscope is explained in another paragraph.

At the completion of each test 5 gallons of lysol were added to the water in the filter and the filter was allowed to stand over night. This was sufficient lysol to kill all of the cysts removed from the water which was filtered and retained in the filter. The filter was then washed in the usual manner and placed in service, filtering coagulated Lake Michigan water. It was kept in continuous service until the next experiment was conducted.

RESULTS OF EXPERIMENTS

Fifteen experiments were run at intervals between May 28, 1935, and February 25, 1936. As stated, they were purposely spread over a long period. The results of the experiments are given in table 1. Cysts were added to the water in all of the experiments except one, in which the water was contaminated with sewage. For the 14 tests in which cysts were used 433 liters (114 gallons) of filtered water were centrifuged and all of the sediment resulting from centrifuging was examined for cysts. The number of cysts in this same volume of water applied to the filter amounted to about 178,000. Only 4 cysts were found in the 114 gallons of filtered water, which is 1 cyst in the filtered water to 44,500 cysts in the applied water. Should the process of concentrating the cysts by centrifuging have recovered only 50 percent of the cysts, the removal by filtration still would be in excess of 99.99 percent.

The water was prechlorinated for some of the experiments, while no chlorine was used in others. The results indicate that prechlorination has no influence on filtration of the cysts from water.

CONCENTRATING CYSTS IN FILTERED WATER

Where there are very few cysts in the water to be examined, they have to be concentrated in some manner. Should it be possible to make tests for cysts in the usual procedure for determining bacteria in water, the enumeration of one cyst in 10 gallons of water still would be a complicated procedure. The method used in the experiments conducted in 1934 was to collect one-gallon samples of the filtered water in bottles, allow the bottles to stand 20 to 24 hours, carefully siphon off the supernatant fluid, then concentrate and examine the sediment under the microscope for cysts. This procedure was cumbersome when 10 to 20 gallons of water had to be examined.

In these experiments a Foerst centrifuge was used for concentrating the cysts in the filtered water. Such apparatus, as has been stated, is satisfactory for concentrating plankton in water and gives from 90 to 100 percent recovery. As the *E. histolytica* cysts are as large as some of the microscopical organisms, it was thought that they could be concentrated by centrifuging with such a device. Table 2 shows that there was good recovery of the cysts by the procedure.

After concentrating the respective quantities of filtered water in the centrifuge, the concentrated material was carefully pipetted into a centrifuge tube by means of a Wright's pipette. The cup in the centrifuge was washed with a little distilled water and the washing added to the material in the centrifuge tube. This was then centrifuged in an International centrifuge at about 1,500 r. p. m. for 10 minutes.

The entire sediment was examined for *E. histolytica* cysts direct and by staining with iodine solution (5-percent aqueous potassium iodide saturated with iodine and diluted with equal parts of distilled water).

For further reference on methods of diagnosing *E. histolytica* cysts, see American Public Health Association Year Book, 1935–36 (2).

SUMMARY

Experiments on the removal of *Endamoeba histolytica* cysts from water by rapid sand filtration have been conducted.

The filter used in the experiments had a surface area of 10 square feet, and contained 24 inches of sand having an effective size of 0.5 mm diameter.

The cysts were not in the water when it was coagulated, but were added to the coagulated water going to the filter. They were fed into the influent water at a constant rate from 5-gallon portions of a suspension of the organisms.

The number of cysts in the influent water varied from 362 to 2,370 per gallon of water. A total of 114 gallons of filtered water was tested and only 4 cysts were found. The percent reduction was in excess of 99.99.

The duration of an experiment was from 3.7 to 13.7 hours. Nine to 74 liters of filtered water were collected at equal intervals during the period of the run.

The filtered water collected for testing was first run through a Foerst centrifuge for concentrating the cysts.

Prechlorinating the water did not affect the efficiency of the filters.

CONCLUSION

Filtration of water through rapid sand filters, in the manner now extensively used throughout the United States, is an effective means of removing *Endamoeba histolytica* cysts from water.

REFERENCES

(1) Spector, Bertha Kaplan, Baylis, John R., and Gullans, Oscar: Effectiveness of Filtration in removing from water, and of chlorine in killing, the causative organism of amoebic dysentery. Pub. Health Repts., *49*: 786-800 (July 6, 1934). (Also Reprint No. 1633.)

(2) Spector, Bertha Kaplan: Tentative methods for the diagnosis of amebiasis and amoebic dysentery. American Public Health Association Yearbook, 1935-36, vol. 26, pp. 130–143, March 1936.

TABLE 1.—*Filtration of amoebic dysentery cysts from water*

Date	May 28, 1935	June 4, 1935	June 11, 1935	June 14, 1935	June 18, 1935	June 20, 1935	June 25, 1935	June 27, 1935	July 2, 1935	Jan. 8, 1936	Jan. 14, 1936	Jan. 16, 1936	Jan. 21, 1936	Jan. 23, 1936	Feb. 25, 1936
Test number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Parts per million of aluminum sulphate	14.7	15.3	15.7	15.2	15.6	16.3	16.7	17.0	16.3	8.6	8.8	8.6	11.5	8.6	8.1
Number of cysts in 5 gallons of suspension	860,000	870,000	427,000	540,000	595,000	651,000	1,156,000	Sewage	1,240,000	2,400,000	2,440,000	2,100,000	2,900,000	2,900,000	2,660,000
Minutes for 5-gallon portions to empty	60	60	60	60	60	60	60	----------	60	60	60	65	62	62	61
Cysts per gallon of influent water	717	725	362	450	498	543	963	Unknown	1,033	2,000	2,033	1,615	2,370	2,370	2,220
Liters of water collected for testing	9	12	22	24	28	26	24	30	26	30	26	38	74	30	58
Number of cysts found in filtered water	1 (?)	0	0	0	1	0	0	0	1	0	0	0	0	1	0
Duration of test in hours	6.5	4.8	5.4	4.6	4.6	5.0	4.6	3.7	5.0	4.0	5.0	6.7	13.7	7.2	11
Hours filter in operation before test was started	0	0	0	0	0	0	0	0	0	5.4	5.2	8.3	0	2.5	3.3
Loss of head on filter at beginning of test, feet	0.6	0.8	0.6	0.7	0.7	0.5	0.6	0.7	0.6	1.6	1.5	4.3	0.7	1.1	1.0
Loss of head on filter at end of test, feet	5.8	10.4	9.2	9.0	7.4	6.2	6.5	6.4	7.0	2.9	3.4	9.0	5.9	9.3	8.3
Water prechlorinated	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes
Residual chlorine, p. p. m.	No test	0.25	1.40	2.50	--------	--------	2.00	----------	----------	----------	----------	.80	0.8	0.9	1.1

TABLE 2.—*Recovery of cysts by centrifuging with Foerst centrifuge*

Test number	Cysts in 1.0 cc of concentrated suspension	Number of cysts recovered from 1.0 cc of concentrated suspension of cysts diluted to 2 liters, then concentrated by centrifuging	Percent recovery
1	350	248	71
2	430	507	118
3	430	350	81
4	170	160	94
5	870	730	84

CITY HEALTH OFFICERS, 1936

Directory of Those in Cities of 10,000 or More Population

Directories of the city health officers in the cities of the United States having a population of 10,000 or more have been published in the Public Health Reports and reprinted as separates [1] for each year from 1916 to 1934, except 1932, for the information of health officers and others interested in public-health activities. These directories have been compiled from data furnished by the health officers. The cities included in this directory are those having populations of 10,000 or more according to the 1930 census.

The asterisk (*) indicates that the officer before whose name it appears has been reported to be a "whole-time" health officer. For this purpose a "whole-time" officer is defined as "one who does not engage in the practice of medicine or in any other business but devotes all of his time to official duties."

City	Name of health officer	Official title
Alabama:		
Anniston	*G. A. Gryor, M. D.	County health officer.
Bessemer	*J. D. Dowling, M. D.	Do.
Birmingham	do	Do.
Decatur	*Leo Roy Murphree, M. D., C. P. H.	Do.
Dothan	*Wyatt Thomas Burkett, M. D.	Do.
Fairfield		
Florence	*W. D. Hubbard, M. D.	Do.
Gadsden	*C. L. Murphree, M. D.	Do.
Huntsville	*W. C. Hatchett, M. D.	Do.
Mobile	*O. L. Chason, M. D., Dr. P. H.	Do.
Montgomery	*J. L. Bowman, M. D.	County and city health officer.
Phenix City	*Marion Leonard Shaddix, M. D.	County health officer.
Selma	*L. T. Lee, M. D.	Do.
Tuscaloosa	*A. A. Kirk, M. D.	County and city health officer.
Arizona:		
Phoenix	*R. W. Hussong, M. D.	City health officer.
Tucson	*Lewis H. Howard, M. D.	Director of City-County Health Service.
Arkansas:		
Blytheville	Max O. Usrey, M. D.	City health officer.
El Dorado	Fergus O. Mahony, M. D.	Do.
Fort Smith	*James Edward Johnson, M. D.	District health officer.
Hot Springs	*James Foster Merritt, M. D.	City and county health officer.
Jonesboro	R. C. Shanlever, M. D.	Chairman, board of health.
Little Rock	*Thomas M. Fly, M. D.	City health officer.
North Little Rock	Val L. Eason, M. D.	Health officer.
Pine Bluff	*Walter Hugh Bruce, M. D.	Director, county health department.
Texarkana	Harry E. Murry, M. D.	City health officer.

[1] Reprints nos. 346, 416, 494, 539, 609, 702, 767, 870, 930, 1025, 1103, 1177, 1257, 1333, 1426, 1521, 1613, and 1685, from the Public Health Reports.

City health officers, 1936—Continued

City	Name of health officer	Official title
California:		
Alameda	Paul Baron, M. D	Health officer.
Alhambra	*J. L. Pomeroy, M. D	County health officer, Hall of Justice, Los Angeles.
Anaheim	*K. H. Sutherland, M. D	County health officer.
Bakersfield	Peter J. Cuneo, LL. B., M. D	City health officer.
Berkeley	*Frank L. Kelly, M. D., Dr. P. H	Health officer.
Beverly Hills	H. H Blodgett, M. D	City health officer.
Brawley	John L. Parker, M. D	Do.
Burbank	*J. L. Pomeroy, M. D	County health officer, Hall of Justice Los Angeles.
Burlingame	H. W. Macomber, M. D	Acting city health officer.
Compton	*J. L. Pomeroy, M. D	County health officer, Hall of Justice, Los Angeles.
Eureka	William J. Quinn, M. D	Health officer.
Fresno	C. Mathewson, M. D	City health officer.
Fullerton	*K. H. Sutherland, M. D	County health officer.
Glendale	*J. L. Pomeroy, M. D	County health officer, Hall of Justice, Los Angeles.
Huntington Park	do	Do.
Inglewood	do	Do.
Long Beach	*G. E. McDonald, M. D	Health officer.
Los Angeles	*George Parrish, M. D	Do.
	*George M. Stevens, M. D	Epidemiologist and first assistant health officer.
	*G. F. Schmelzel, M. D	Chief deputy health officer.
	*A. L. Peterson	Executive assistant.
	Divisional directors:	
	*Charles F. Kiley	Chief accountant.
	*J. L. Lanigan	Secretary to health board.
	Harry Cohn, M. D	Director of tuberculosis.
	*Agnes M. Talcott	Director of nurses.
	*F. W. Peterson	Director of vital statistics.
	*John Carman	Chief chemist.
	Mona Bettin, M. D	Chief bacteriologist.
	*Morris S. Siegel	Director of housing and sanitation.
	*G. L. Clark, D. V. M	Director of milk and meat inspection.
	*H. Manning Elliott, M. D	Director of venereal clinic (male).
	*Emily F. Balcom, M. D	Director of venereal clinic (female).
	Lyle McNeile, M. D	Director, maternity division.
	*C. K. Stewart	Director of rodent division.
	*J. M. Cain	Director of quarantine and morbidity division.
	*L. V. Dieter, D. Phar	Director of laboratories.
	*Lillian Kositza, M. D	Director, child hygiene division.
Modesto	*E. F. Reamer, M. D	County health officer.
Monrovia	*J. L. Pomeroy, M. D	County health officer, Hall of Justice, Los Angeles.
Oakland	*N. N. Ashley, M. D	Health officer.
Ontario	Calvert L. Emmons, M. D	Do.
Palo Alto	*Louis Olsen, S. E	Do.
Pasadena	*Wilton L. Halverson, M. D., Dr. P. H.	Do.
Pomona	*J. L. Pomeroy, M. D	County health officer, Hall of Justice, Los Angeles.
Redlands	Frank H. Folkins, M. D	City health officer.
Richmond	*Charles R. Blake, M. D	Commissioner of health.
Riverside	*W. A. Jones, M. D	Health commissioner.
Sacramento	*Herbert F. True, M. D	City health officer.
Salinas	*Miss Marie K. Fidel, P. H. N	Do.
San Bernardino	G. Stirling Landon, M. D	Health officer.
San Diego	*Alex M. Lesem, M. D	Director of health.
San Francisco:		
Department of public health.	Health advisory board:	
	T. J. Lenehan, Chairman.	
	Lawrence Arnstein	
	Frank J. Klimm	
	Frank H. McKevitt, D. D. S	
	Langley Porter, M. D	
	W. C. Voorsanger, M. D	
	J. W. Ward, M. D	
	Consultants:	
	P. J. Hanzlik, M. D	
	C. G. Hyde, C. E	
	C. D. Leake, Ph. D	
	M. S. Marshall, Ph. D	
	K. F. Meyer, Ph. D	
	A. C. Reed, M. D	
	Alanson Weeks, M. D	
	Executive staff:	
	*J. C. Geiger, M. D	Director of public health.
	*J. P. Gray, M. D	Assistant director of public health.
	*C. M. Woolenberg, Ph. G	Director of institutions and superintendent, Laguna Honda Home.

City health officers, 1936—Continued

City	Name of health officer	Official title
California—Continued.		
San Francisco:		
Department of public health.	*L. M. Wilbor, M. D.	Superintendent, San Francisco Hospital.
	*W. C. Vandervcnter, M. D.	Acting medical superintendent, Hassler health home.
	Edmund Butler, M. D.	Chief surgeon, emergency hospital service.
	*J. I. O'Dea	Chief steward, emergency hospital service.
	George H. Becker, M. D.	Director, bureau of communicable diseases.
	R. W. Burlingame, M. D.	Resident physician, isolation division, San Francisco Hospital, and chief, division of venereal disease control.
	*P. S. Barrett, M. D.	Director, bureau of child hygiene.
	*Ernestine Schwab	Director, division of field nursing.
	Olga Bridgman, M. D.	Chief, division of mental hygiene.
	Robert Grosso, D. D. S.	Chief, division of dental hygiene.
	*T. P. Lydon	Director, bureau of food and milk.
	*J. J. Burke	Chief, food and restaurant inspection.
	*B. Q. Engle	Chief, pasteurizing plant inspection.
	*C. G. Hansen	Chief, meat and market inspection.
	*F. W. Orme, D. V. M.	Chief, abattoir inspection.
	*A. B. Crowley	Chief, industrial hygiene.
	*H. P. Thyle	Chief, housing inspection.
	*W. D. Hobro	Chief, plumbing inspection.
	*Kathryn B. Walker, M. D.	Bacteriologist-in-charge, division of bacteriology-serology.
	*Clinton G. Davis	Senior chemist, division of chemistry.
	*P. R. Hennessy	Senior accountant.
	*R. C. Miller	Vital statistician.
San Jose	*Henry C. Brown, M. D.	City health officer.
San Leandro	*Joseph P. Rose	Food inspector.
San Mateo	James A. Warburton, M. D.	Director of public health.
Santa Ana	*K. H. Sutherland, M. D.	County health officer.
Santa Barbara	*Clarence T. Roome, M. D.	Health officer.
Santa Cruz	Mahlon D. McPherson, M. D.	Do.
Santa Monica	*J. L. Pomeroy, M. D.	County health officer, Hall of Justice Los Angeles.
Santa Rosa	*E. J. Helgren, B. S. in chemistry; Dr. B.	Health officer.
South Gate	*J. L. Pomeroy, M. D.	County health officer, Hall of Justice, Los Angeles.
South Pasadena	Albert Supple, M. D.	Health officer.
Stockton	*John J. Sippy, M. D.	District health officer.
Vallejo		
Ventura	J. A. DeSerpa, D. V. M.	City health officer.
Whittier	*J. L. Pomeroy, M. D.	County health officer, Hall of Justice, Los Angeles.
Colorado:		
Boulder	*H. L. Moreney, Ph. B., D. V. M.	Director of public health and sanitation.
Colorado Springs	Omer R. Gillett, Ph. B., M. D.	Health officer.
Denver	*Theodore Williams, M. D.	Deputy manager of health.
Fort Collins	T. C. Taylor, M. D.	Health officer.
Grand Junction	E. H. Munro, M. D.	City physician.
Greeley	W. A. Schoen, M. D.	City health officer.
Pueblo	*W. E. Buck, M. D.	Chief, department of health, sanitation and inspection.
Trinidad	Bernard M. Cawley, M. D.	City physician.
Connecticut:		
Ansonia	Louis H. Wilmot, M. D.	City health officer.
Bridgeport	*Richard O'Brien Shea, M. D.	Health officer and registrar.
Bristol	Benjamin B. Robbins, M. D.	City health officer.
Danbury	Felix F. Tomaino, M. D.	Do.
Derby	Thomas F. Plunkett, M. D.	Do.
East Hartford	F. W. Brecker, M. D.	Do.
Enfield	F. F. Simonton, M. D.	Health officer.
Fairfield	*Laurence E. Poole, M. D., Dr. C. P. H.	Do.
Groton	Frank William Hewes, M. D.	Do.
Hamden	George H. Joslin, M. D.	Superintendent of health.
Hartford	*Benjamin G. Horning, M. D., C. P. H.	Do.
Manchester	D. C. Y. Moore, M. D.	Chairman, board of health.
Meriden	Michael J. Sullivan, M. D.	Health officer.
Middletown	Louis O. La Bella, M. D.	Do.
Milford		
Naugatuck		
New Britain	*Louis J. Dumont, M. D.	Superintendent of health.
New Haven	*Joseph I. Linde, M. D.	Health officer.
New London	*Benjamin N. Pennell, D. V. S.	Do.

City health officers, 1936—Continued

City	Name of health officer	Official title
Connecticut—Continued		
Norwalk		
Norwich	Harrison Gray, M. D.	Health officer.
Shelton		
Stamford	*Raymond D. Fear, M. D., Dr. P. H.	Health commissioner.
Stonington	William T. Veal, M. D.	Health officer.
Stratford	DeRuyter Howland, M. D.	Do.
Torrington		
Wallingford		
Waterbury	Edward J. Godfrey, M. D.	Do.
West Hartford	*Harry B. Smith, M. D., M. P. H.	Director of health.
Willimantic	Reuben Rothblatt, M. D.	Acting city health officer.
Delaware:		
Wilmington	Roger Murray, M. D.	Executive secretary, board of health.
District of Columbia:		
Washington	*George C. Ruhland, M. D.	Health officer.
	*Arthur G. Cole	Chief clerk and deputy health officer.
Bureau of preventable diseases.	*James G. Cumming, M. D.	Director.
Medical inspection of schools.	*Joseph A. Murphy, M. D.	Do.
Food inspection	*Reid R. Ashworth, D. V. S.	Do.
Sanitary inspection	*J. Frank Butts, LL. B.	Do.
Vital statistics	*Joseph B. Irvine	Do.
Chemical laboratory	John B. Reed	Do.
Bacteriological laboratory	*John E. Noble	Do.
Serological laboratory	Jesse P. Porch, D. V. M.	Do.
Child welfare and hygiene service.	*Hugh J. Davis, M. D.	Do.
Pound		
Tuberculosis	A. Barklie Coulter, M. D.	Do.
Nursing	*Mrs. Josephine Pittmann Prescott.	Do.
Maternity welfare	J. Bay Jacobs, M. D.	Do.
Florida		
Daytona Beach	*Simon Reed	Health officer.
Gainesville		
Jacksonville	*N. A. Upchurch, M. D.	Do.
Key West	William R. Warren, M. D.	City health officer.
Lakeland	*J. D. Griffin, M. D.	City physician and health officer.
Miami	*George N. MacDonell, M. D.	Director of public health.
Orlando	Claude Anderson, M. D.	City health officer.
Pensacola	*William H. Pickett, M. D., C. P. H.	Director, county health department.
St. Augustine	Herbert E. White, M. D.	City health officer.
St. Petersburg	*Frederick F. Kumm, M. D.	City physician.
Sanford	J. N. Tolar, M. D.	Health officer.
Tallahassee	*Leander Johnson Graves, M. D.	Director, county health unit.
Tampa	*James R. McEachern, M. D.	City health officer.
West Palm Beach	W. E. Van Landingham, M. D.	City health officer and city physician.
Georgia:		
Albany		
Athens	*Welford W. Brown, M. D.	Commissioner of health.
Atlanta	*John P. Kennedy, M. D.	City health officer.
Augusta	*Thomas B. Phinizy, M. D.	Acting commissioner of health.
Brunswick	*Millard E. Winchester, M. D., Dr. P. H.	Commissioner of health.
Columbus	William Edgar Mayher, M. D.	City health officer.
Decatur	H. Homer Allen, M. D.	Do.
Griffin	*William C. Humphries, M. D.	Commissioner of health.
Lagrange	*S. O. Rutland, M. D.	Health officer.
Macon	*J. D. Applewhite, M. D., M. P. H.	Do.
Rome	*B. V. Elmore, Dr. P., M. D.	Commissioner of health.
Savannah	*Victor H. Bassett, M. D.	City health officer.
Thomasville	J. R. Dykes, M. D.	County health officer.
Valdosta	*Gordon T. Crozier, M. D., D. P. H.	City health officer.
Waycross	*George E. Atwood, M. D., D. P. H.	Commissioner of health.
Idaho:		
Boise	*C. K. Macey	Health officer.
Pocatello	*Archer Townsend	Sanitary inspector.
Illinois:		
Alton	D. M. Roberts, M. D.	Health commissioner.
Aurora	George W. Haan, M. D.	Health commissioner and registrar.
Belleville	*William Farley	Health officer.
Berwyn	*Edward J. Farrell, M. D.	Health director.
Bloomington	Ben Markowitz, M. D.	Do.
Blue Island	A. J. Roemisch, M. D.	Commissioner of health
Brookfield	Harriet L. Hoeckendorf, R. N.	Health commissioner.
Cairo		

City health officers, 1936—Continued

City	Name of health officer	Official title
Illinois—Continued.		
Calumet City	Andrew Nady, M. D	Health commissioner
Canton	J. C. Simmons, M. D	City physician.
Centralia	J. M. Haney, M. D	Health officer.
Champaign	C. George Appelle, M. D	City health officer
Chicago	*Herman N. Bundesen, M. D	President, board of health.
	H. O. Jones, M. D	Assistant to the president.
	Louis E. Schmidt, M. D	Secretary.
Bureau of communicable diseases.	Isaac D. Rawlings, M. D	Chief of bureau.
Bureau of child welfare	Henry C. Niblack, M. D	Do.
Bureau of laboratories and research.	John L. White, M. D	Do.
Bureau of public health engineering.	Joel I. Connolly	Do.
Bureau of dairy products.	Henry C. Becker, M. D. V	Do.
Bureau of food inspection.	J. P. Kilcourse	Do.
Chicago Heights	Hugo Long, M. D	Health officer.
Cicero	Frank J. Pokorney, Ph. C., M. D.	Health commissioner.
Danville	C. M. Cook, M. D	Health officer.
Decatur	*W. M. Talbert, M. D	City health physician.
East Moline	John Henry Fowler, M. D	Health officer.
East St. Louis	*Albert P. Lauman	Commissioner of public health.
Elgin	*A. L. Mann, M. D	Executive officer.
Elmhurst	Frank D. Leahy, M. D	President, board of health.
Elmwood Park	James A. Moxon, M. D.	Health commissioner.
Evanston	*John W. H. Pollard, M. D	Commissioner of health.
Forest Park	G. J. Baumgartner, M. D	Do.
Freeport	Robert J. Burns, M. D	Do.
Galesburg	*E. D. Wing, M. D	Health commissioner.
Granite City	M. E. Kirkpatrick	Chairman, board of health.
Harrisburg	B. E. Montgomery, M. D	City physician.
Harvey	John W. Blair, M. D	Health officer.
Highland Park		
Jacksonville	Friederich Engelbach, M. D	City health warden.
Joliet	*E. J. Higgins, M. D	Health commissioner.
Kankakee	*C. K. Smith, M. D	Health officer.
Kewanee	C. Paul White, M. D	President, board of health.
La Grange	T. C. McDougal, M. D	Health officer.
La Salle	*Arlington Ailes, M. D., C. P. H.	Health commissioner.
Lincoln	*George Seller	City health officer.
Mattoon	Lovell A. Neal, M. D	Health officer.
Maywood	R. L. Reynolds, M. D	Health commissioner.
Melrose Park	Edmund G. Brust, M. D	Commissioner of health.
Moline	O. C. Ellis, M. D	City physician.
Mount Vernon		
Oak Park	Frank S. Needham, M. D	Commissioner of health.
Ottawa	E. P. Hathoway, M. D	Health officer.
Park Ridge		
Pekin	C. G. Muehlmann, M. D	Do.
Peoria	Sumner M. Miller, M. D	Commissioner of health.
Quincy	*H. O. Collins, M. D	Public health officer.
Rock Island	Harry W. Shuman, M. D	Health commissioner.
Rockford	*Norman C. Bullock, M. D	Commissioner of health.
Springfield	H. H. Tuttle, M. D	Superintendent of health.
Sterling	Herbert M. Jacobs, M. D	City health officer.
Streator	T. K. Jennings, M. D	President, board of health.
Urbana	L. M. T. Stilwell, M. D	Health commissioner.
Waukegan	Rowland M. Ekstrand, M. D	City physician.
West Frankfort	Wm. Thad Fife	City health officer.
Wilmette	Martin H. Seifert, Ph. D., M. D.	Commissioner of health.
Winnetka	*Howard A. Orvis, M. D., M. S. in P. H.	Health officer.
Indiana:		
Anderson	George B. Metcalf, M. D	Health commissioner.
Bedford	Charles Blackburn	City health officer.
Bloomington	Charles E. Holland, M. D	Secretary, city board of health.
Connersville	Herman W. Smelser, M. D	County health commissioner.
Crawfordsville	Fred N. Daugherty, M. D	Secretary, board of health.
East Chicago	David R. Johns, M. D	Do.
Elkhart	A. W. Kistner, M. D	Secretary, city board of health.
Elwood	W. Merle Hoppenrath, M. D	Do.
Evansville	Thomas F. Reitz, M. D	Do.
Fort Wayne	Karl C. Eberly, M. D	City health commissioner.
Frankfort	Milton T. McCarty, M. D	City health officer.
Gary	Bellfield Atcheson, M. D	Health commissioner.
Goshen	G. A. Whippy, M. D	City health officer.
Hammond	Herschel G. Cole, M. D	Health commissioner.
Huntington	R. F. Frost, M. D	Secretary, board of health.
Indianapolis	*H. G. Morgan, M. D	Health commissioner.
Jeffersonville	Sam Adair, M. D	City health commissioner.
Kokomo	Will J. Martin, M. D	Secretary, board of health.
La Fayette	Harry J. Laws, M. D	Do.

City health officers, 1936—Continued

City	Name of health officer	Official title
Indiana—Continued.		
La Porte	Jon Nelson Kelly, M. D.	Health officer.
Logansport	Louis P Denner	Health inspector.
Marion	G. R. Daniels, M. D	Secretary, board of health.
Michigan City	N. R. Carlson, M. D	Secretary and health officer.
Mishawaka	Harry J. Magrane, D. V. M., M. D.	Sanitary and health officer.
Muncie	Jules LaDuron, M. D	Secretary, board of health.
New Albany	W. L. Starr, M. D	City health officer.
Newcastle	Walter M. Stout, M. D	Secretary, board of health.
Peru	F. M. Lynn, M. D	City health officer.
Richmond	Charles J. Hufnagel, M. D	Secretary, board of health.
Shelbyville	Paul R. Tindall, M. D	Do
South Bend	F. R. Nicholas Carter, M. D	Executive secretary and health officer.
Terre Haute	Maurice B. Van Cleave, M. D	Secretary, city board of health.
Vincennes	Norman E. Beckes, M. D	Secretary, board of health.
Whiting	Jeremiah A. McCarthy, M. D	Health commissioner.
Iowa.		
Ames	B. D. Atchley, M. D	City health officer.
Boone	William Woodburn, M. D	Health officer.
Burlington	Arthur C. Schach, M. D	Do.
Cedar Rapids	Victor H. Hasek, M. D	City physician.
Clinton	J. C. Burke, M. D	Health physician.
Council Bluffs	J. M. Moskovitz, M. D	Health officer.
Davenport	George Braunlich, Ph. B., M. D.	City physician
Des Moines	Harry E. Ransom, M. D	Commissioner of health.
Dubuque	Walter J. Connell, M. D., M. P. H.	Health director.
Fort Dodge	T. M Riordan	Sanitary officer.
Fort Madison	Joseph M. Casey, M. D	Physician, board of health.
Iowa City	Isom A Rankin, M. D	Health officer.
Keokuk	Charles A. Dimond, M. D	Physician to board of health.
Marshalltown	R. S. Grossman, M. D	Health officer.
Mason City	C. M. Franchere, M. D	City health director.
Muscatine	Rodney M. Arey, M. D	City health officer.
Newton	E. A. McMurray, M. D	City health physician.
Oskaloosa	Oscar J. DuBois, D. O	City health officer.
Ottumwa		
Sioux City	*W. S. Petty, M. D	Director, county health unit.
Waterloo	R. W. Driver, M. D	Health officer.
Kansas:		
Arkansas City	P. F. Theis, M. D	City health officer.
Atchison	W. K. Fast, M. D	Do.
Chanute	James A. Butin, M. D	Do.
Coffeyville	P. S. Townsend, M. D	City physician and health officer.
Dodge City	K. F. Alexander, M. D	County and city health officer.
Eldorado	F. A. Loman	Sanitary inspector.
Emporia	*C. H. Munger, M. D	County health director.
Fort Scott	O. L. Mosley, M. D	City health officer.
Hutchinson	Guy R. Walker, M. D	City physician.
Independence	E. C. Wickersham, M. D	City and county health officer.
Kansas City	*W. F. Lunsford, M. D., M. P. H.	City director of health.
Lawrence	J. M. Mott, M. D	Superintendent of health.
Leavenworth	Alonzo R. Adams, M. D	City physician.
Manhattan	Darrel L. Evans, M. D	County health officer.
Newton	W. F. Schroeder, M. D	Do.
Parsons	L. A. Proctor, M. D	City physician.
Pittsburg	C. Mart Montee, M. D	City health officer.
Salina	W. R. Dillingham, Ph. B., M. D.	Health officer.
Topeka	*Fred Power Helm, M. D	City health officer.
Wichita	J. E. Wolfe, M. D	Director of public welfare
Kentucky:		
Ashland	*Robert Donald Higgins, M. D., M. P. H.	Director of health.
Bowling Green	*G. M. Wells, M. D	County health officer
Covington	Theodore Sallee, M. D	City health officer.
Fort Thomas	Frank H. Southgate, M. D	Health officer.
Frankfort	R. M. Coblin, M. D	City health officer.
Henderson	*J. Leland Tanner, M. D., M. P. H.	Director, county health department.
Hopkinsville	Philip E. Haynes, M. D	City health officer.
Lexington	*Charles M. Moore, M. D	Health officer.
Louisville	Hugh R. Leavell, M. D	Director of public health.
Middlesboro		
Newport	John Todd, M. D	City health officer.
Owensboro	A. L. Kincheloe, M. D	Health director.
Paducah	*Russell E. Teague, M. D., C. P. H.	Director, county health department.
Louisiana:		
Alexandria		
Baton Rouge	T. Jeff McHugh, M. D	City health officer.
Bogalusa	J. H. Slaughter, M. D	City physician.

City health officers, 1936—Continued

City	Name of health officer	Official title
Louisiana—Continued.		
Lafayette	*G. A. Martin, M. D	City physician
Lake Charles	W. P. Bordelon, M. D	President, board of health.
Monroe	D. I. Hirsch, M. D	Do.
New Orleans	J. M. Batchelor, M. D	Superintendent of public health.
Shreveport	*W. J. Sandidge, M. D., C. P. H	Director, city-parish health department.
Maine:		
Auburn	*Shirley J. Davis, R. N	Health officer.
Augusta	George A. Coombs, M. D	Do.
Bangor	*Harry D. McNeil, M. D	Do.
Bath	Joseph I. Smith, M. D	Do.
Biddeford	Oscar Perrault, M. D	Do.
Lewiston	*Robert J. Wiseman, Jr., M. D	Do.
Portland	*Thomas Tetreau, M. D	City health officer.
Sanford	*William H. Kelly, M. D	Local health officer.
South Portland	Waldo T. Skillin, M. D	Health officer.
Waterville	*Arthur R. Daviau, M. D	Do.
Westbrook	Patrick H. Welch	Local health officer.
Maryland:		
Annapolis	James J. Murphy, M. D	City health officer.
Baltimore:		
Administration	*Huntington Williams, M. D., Dr. P. H.	Commissioner of health.
	*William H. F. Warthen, M. D	Assistant commissioner of health.
	*Harry S. Mustard, M. D	Health officer, eastern health district.
	*George W. Hemmeter, M. D	Health officer, western health district.
Bureau of vital statistics	*W. Thurber Fales	Director.
Bureau of public education.	*Dorthy Yoe Kalbeu	Do.
Medical section:		
Bureau of communicable diseases.	*Adolph Weinzirl, M. D	Epidemiologist.
Sydenham Hospital	*Myron G. Tull, M. D	Superintendent.
Bureau of tuberculosis	Bartus T. Baggott, M. D	Director.
Bureau of venereal diseases.	*Ferdinand O. Reinhard, M. D	Do.
Bureau of occupational diseases.	*John M. McDonald, M. D	Do.
Bureau of child welfare	*William K. Skilling, M. D	Do.
Division of school hygiene.	*H. Warren Buckler, M. D	Chief.
Dental clinics	Morris Cramer, D. D. S	Supervisor.
Laboratories	*C. Leroy Ewing	Director.
Public health nursing	*Jane B. Laib, R. N	Do.
Sanitary section	*R. S. Craig	Do.
Bureau of milk control	*John A. Lescure	Do.
Bureau of food control	*Ferdinand A. Korff	Do.
Bureau of meat inspection.	*William Brenner, V. D	Chief.
Bureau of environmental hygiene.	*Wilmer H. Schulze, Phar. D.	Director.
Cumberland	*Joseph P. Franklin, M. D	City and county health officer.
Frederick	*E. C. Kefauver, M. D	Deputy State health officer.
Hagerstown	*W. R. Cameron, M. D	City and county health officer.
Salisbury	*S. H. Hurdle, M. D	Deputy State health officer.
Massachusetts:		
Adams	James F. McLaughlin, M. D	Chairman, board of health.
Amesbury	Clarence S. Morse	Agent, board of health.
Arlington	*William H. Bradley	Do.
Athol	Marion B. Sibley, M. D	Secretary, board of health.
Attleboro	Ralph P. Kent, M. D	Health officer.
Belmont	*Keble B. Perine, B. S. in P. H	Agent, board of health.
Beverly	*Alonzo O. Woodman	Clerk and agent, board of health.
Boston	*William B. Keeler, M. D	Health commissioner.
	*Joseph A. Cahalan	Secretary.
Divisions:		
Medical	*M. Victor Safford, M. D	Deputy commissioner.
Communicable diseases	*Frederick J. Bailey, M. D	Do.
Bacteriological laboratory.	*Karl R. Bailey, M. D	Do.
Food	*P. H. Mullowney, D. V. M	Do.
Child hygiene	Charles F. Wilinsky, M. D	Do.
Sanitary	*M. Victor Safford, M. D	Acting deputy commissioner.
Tuberculosis	*George O'Donnell, M. D	Deputy commissioner.
Vital statistics	*Joseph W. Monahan	Do.
Braintree	*John A. Hedlund	Health officer and secretary.
Brockton	David B. Tuholski, M. D	Health officer.
Brookline	Francis P. Denny, M. D	Do.
Cambridge	Simon B. Kelleher, M. D	Medical inspector.
Chelsea	*John F. Welch	Health officer.
Chicopee	*Paul G. Martel	Agent and clerk.
Clinton	*Frederick E. Murphy	Health officer.

City health officers, 1938—Continued

City	Name of health officer	Official title
Massachusetts—Continued.		
Danvers	*Hugo Nappe, R. N.	Health officer.
Dedham	Thomas J. Brennan	Do.
Easthampton	Charles J. Hansen, M. D.	Agent, board of health.
Everett	William F. Hogan	Do.
Fairhaven	*W. F. Delano	Secretary and executive officer.
Fall River	*Ernest M. Morris, M. D., C. M.	Health commissioner.
Fitchburg	*Fred R. Brigham	Agent, board of health.
Framingham	*David Moxon, C. P. H.	Do.
Gardner	*William P. O'Donnell	Do.
Gloucester	George S. Rust, M. D.	Health officer.
Greenfield	*George P. Moore	Agent, board of health.
Haverhill	*Frederick W. Morse	Clerk and agent, board of health.
Holyoke	*Daniel P. Hartnett, Ph. G.	Health officer.
Lawrence	*Daniel J. Costello	Clerk, board of health.
Leominster	Hugh E. Crain	Agent, board of health.
Lowell	*John J. McNamara, S. E., M. D.	Director of health.
Lynn	James A. Dumas, M. D.	Commissioner of public health.
Malden	*May C. Welsh	Clerk and agent, board of health.
Marlboro	*Mary N. O'Connor, R. N.	Agent, board of health.
Medford	William N. Lanigan, M. D.	Medical inspector.
Melrose	Clarence P. Holden, M. D.	Chairman, board of health.
Methuen	John Oddy, M. D.	Board of health physician.
Milford	Walter H. Chapin	Sanitary inspector.
Milton	Paul W. Kimball, M. D.	Agent, board of health.
Natick	Charles D. Colford, D. M. D.	Do.
Needham	*Edward W. Palmer	Acting health officer.
New Bedford	*William G. Kirschbaum	Agent and executive officer.
Newburyport	*Wilbur N. O'Brien, Ph. G.	Agent, board of health.
Newton	*Harold D. Chope, M. D., M. P. H.	Director of public health.
North Adams	*Douglas W. Hyde, S. E.	Agent, board of health.
North Attleboro	Daniel J. Kiley, M. D.	Health officer.
Northampton	George R. Turner	Agent, board of health.
Norwood	*John A. Shannon	Agent, board of health.
Peabody	*Percy F. Murray	Do.
Pittsfield	*Willys M. Monroe, M. D.	Health commissioner.
Plymouth	Almeda Chandler	Clerk, board of health.
Quincy	Richard M. Ash, M. D.	Health commissioner.
Revere	Frank F. Sandler, M. D.	Chairman and health officer.
Salem	*John J. McGrath	Agent, board of health.
Saugus	Myron H. Davis, M. D.	Chairman, board of health.
Somerville	Frank L. Morse, M. D.	Medical inspector and bacteriologist.
Southbridge	*Albert R. Brown	Agent, board of health.
Springfield	*L. Jackson Smith, M. D.	Commissioner of public health.
Stoneham	*George A. Hinchcliffe	Health officer.
Swampscott	*Clarence W. Horton	Do.
Taunton	John I. McNamara, M. D.	Chairman, board of health.
Wakefield	David Taggart	Health officer and agent.
Waltham	*Joseph T. Mulcahy	Director of public welfare.
Watertown	*Fred W. Bridge	Agent, board of health.
Webster	Arthur D. Chartier, M. D.	Physician, board of health.
Wellesley	Curtis M. Hilliard	Supervisor of health.
West Springfield	John J. Lysaght	Agent, board of health.
Westfield	Robert M. Marr, M. D.	Chairman, board of health.
Weymouth	Frederick L. Doucett, M. D.	Clerk, board of health.
Winchester	*Maurice Dinneen	Agent, board of health.
Winthrop	*William D. Childress	Health officer.
Woburn	*Edward F. Gorman	Agent and secretary, board of health.
Worcester	*Peter O. Shea, M. D.	Director of public health and school hygiene.
Michigan:		
Adrian	W. S. Mackenzie, M. D.	Health officer.
Alpena	Francis J. O'Donnell, M. D.	Do.
Ann Arbor	John A. Wessinger, M. D., Dr. P. H.	City health officer.
Battle Creek	*A. A. Hoyt, M. D.	Health officer and registrar.
Bay City	G. W. Moore, M. D.	Health officer.
Benton Harbor	E. R. Taylor, M. D.	Director of public health.
Dearborn	C. A. Christensen, M. D.	Commissioner of health and sanitation.
Detroit	Board of health:	
	Ledru O. Geib, M. D.	President.
	Gustavus D. Pope	Vice president.
	William M. Walker	
	William A. Evans, M. D.	
	Executive staff, department of health:	
	*Henry F. Vaughan, Dr. P. H.	Commissioner of health.
	Bert C. Easterbrook, M. D.	Deputy commissioner.
	*Fred M. Meader, M. D.	Deputy commissioner and secretary.
	*Don W. Gudakunst, M. D.	Deputy commissioner and medical director.

City health officers, 1936—Continued

City	Name of health officer	Official title
Michigan—Continued.		
Detroit—Continued.	Executive staff, department of health.	
	*Joseph A. Kasper, M. D	Director of laboratories.
	A. C. Thompson, D. D. S	Director of school dental service.
	*Miss Grace Ross, R. N	Superintendent of nursing.
	Russell W. Alles, M. D	Director of prenatal division.
	*John F. Roehl	Director of special investigation.
	——— ———	Director, social hygiene division.
	*Bruce H. Douglas, M. D	Tuberculosis controller.
	*George E. Phillips	Superintendent of Herman Kiefer Hospital.
	Henry S. Willis	Superintendent of William H. Maybury Sanatorium.
	*F. Gardner Legg, C. E	Director of sanitary engineering.
	*Edward C. Schultz	Director of dairy and food inspection.
	*Arthur P. Derby, M. D	Director of division of tuberculosis.
	*G. Arthur Blakeslee	Director of division of vital statistics.
	*Franklin H. Top, M. D	Medical director and epidemiologist of Herman Kiefer Hospital.
Ecorse	L. H. Van Becelaere, M. D	Health officer.
Escanaba	Harry J. Defnet, M. D	Do.
Ferndale	W. L. Dumond, M. D	Do.
Flint	C. J. Scavarda, M. D	Health officer and registrar.
Grand Rapids	*John L. Lavan, M. D	Health director.
Grosse Pointe	*Benjamin H. Warren, M. D	Health commissioner.
Hamtramck	Stephen S. Skrzycki, M. D	Do.
Highland Park	William N. Braley, M. D	Health officer.
Holland	W. M. Tappan, M. D	Do.
Iron Mountain	J. L. Browning, M. D	Do.
Ironwood	C. C. Urquhart, M. D	Do.
Jackson	*Elmer J. MacLachlan, D. V. M	Do.
Kalamazoo	*Irmel W. Brown, M. D	Director of public health.
Lansing	*E. R. Van der Slice, M. D	Director of health.
Lincoln Park	Dan R. Herkimer, M. D	Health officer.
Marquette	*Charles P. Drury, M. D	Do.
Menominee	John T. Kaye, M. D	Do.
Monroe	James A. Humphrey, M. D	Do.
Mount Clemens	W. J. Kane, M. D	Do.
Muskegon	M. E. Stone, M. D	Do.
Muskegon Heights	O. M. La Core, M. D	Do.
Niles	Lawrence M. Rutz, M. D	Health commissioner.
Owosso	W. E. Ward, M. D	City health officer.
Pontiac	*Charles A. Neafie, M. D., M. S. in P. H.	Director of public health.
Port Huron	A. L. Callery, M. D	Health officer.
River Rouge	Harvey S. Broderson, M. D	Do.
Royal Oak	Donald A. Cameron, M. D	Director of public health.
Saginaw	*Frank A. Poole, M. D	City health officer.
Sault Ste Marie	E. A. Cornell, M. D	Health officer.
Traverse City	George A. Holliday, D. D. S., M. D.	Do.
Wyandotte	E. H. Engel, M. D	Health commissioner.
Ypsilanti	Bradley M. Harris, M. D	Health officer.
Minnesota:		
Albert Lea	Donald S. Branham, M. D	Do.
Austin	H. M. Fisch, M. D	Chairman, board of health.
Brainerd	R. A. Beise, M. D	Do.
Duluth	*Mario McC. Fischer, M. D	Director of public health.
Fairbault	Frederick U. Davis, M. D	Health commissioner.
Hibbing	Carl N. Harris, M. D	Health officer.
Mankato	Henry Bradley Troost, M. D	City health officer.
Minneapolis	*F. E. Harrington, LL. D., M. D	Commissioner of health.
Rochester	C. H. Mayo, M. D.[1]	Health officer.
St. Cloud	Henry W. Goehrs, M. D	City physician.
St. Paul	*R. B. J. Schoch, M. D	Chief health officer.
South St. Paul	O. S. Ely, M. D	Commissioner of health.
Virginia	Robert P. Pearsall, M. D	Health officer.
Winona	William Vardeman Lindsay, M. D.	Do.
Mississippi:		
Biloxi		
Clarksdale	*N. C. Knight, M. D., C. P. H	Director, county health department.
Columbus	C. E. Lehmberg, M. D	City health officer.
Greenville	*John W. Shackelford, M. D., M. P. H.	Director, county health department.
Greenwood	*Levi A. Barnett, M. D	Director of health.
Gulfport	Daniel J. Williams	County health officer.
Hattiesburg	*B. D. Blackwelder, M. D., C. P. H.	Director, county health department.

[1] D. C. Lockhead, M. D., D. P. H., deputy health officer, full time.

City health officers, 1936—Continued

City	Name of health officer	Official title
Mississippi—Continued.		
Jackson	*William Earl Noblin, M. D	Director, county health department.
Laurel		
McComb	*T. Paul Haney, Jr., M. D., C. P. H.	Director of health department.
Meridian	*D. V. Galloway, M. D., M. P. H.	Director, county health department.
Natchez	*A. R. Perry, M. D., M. P. H	Do.
Vicksburg	*F. Michael Smith, M. D	Do.
Missouri:		
Cape Girardeau	*C. O. Summers	Health officer.
Columbia	A. W. Kampschmidt, M. D	Acting health commissioner.
Hannibal	*E. M. Lucke, M. D	Health officer.
Independence	F. L. Cook, M. D	City physician.
Jefferson City	James G. Bruce, M. D	Do.
Joplin	V. E. Kenney, M. D	Commissioner of health and sanitation.
Kansas City	Edwin Henry Schorer, M. D., Dr. P. H.	Director of health.
Maplewood	Pierre M. Brossard, M. D	Health commissioner.
Moberly	H. C. Griffiths, M. D	City physician and health commissioner.
St. Charles	L. E. Belding, M. D	Health officer.
St. Joseph	J. M. Allaman, M. D	City health officer.
St. Louis	*Jos. F. Bredeck, M. D., D. P. H.	Health commissioner.
	*H. I. Spector, M. D	Assistant health commissioner.
	*W. Scott Johnson	Sanitary engineer.
	*Jos. C. Willett, D. V. M	Chief of laboratories.
	Arthur Kelley	Chief of food control.
	Milton R. Fisher, M. D	Milk controller.
	*Walter E. Cook	Field supervisor.
	*Harry M. Stamm, D. D. S	Dental supervisor.
	*A. L. Kavanaugh, M. D	Chief, venereal clinic.
	*Mildred Sanderson, R. N	Municipal nurses' supervisor.
	*W. C. Dillard, D. V. M	Veterinary meat inspector.
	*H. V. Persells, D. V. M	Do.
	*C. B. Michael, D. V. M	Do.
	*Downey L. Harris, M. D	Rabies controller.
	*Thomas Chamberlain	Recorder of births and deaths.
	J. Earl Smith, M. D	Epidemiologist.
	*F. T. Suit, D. V. M	Supervisor, meat control.
	*Arthur H. Knost, D. V. M	Veterinary milk inspector.
	*L. A. Rosner, D. V. M	Do.
	*C. A. Paige, D. V. M	Do.
Sedalia	*Raymond Fetters	Sanitary officer.
Springfield	*Charles A. George, M. D	Commissioner of health and sanitation.
University City	O. P. Hampton, Jr., M. D	Health commissioner.
Webster Groves	Carl C. Irick, M. D	Do.
Montana:		
Anaconda	John J. Malee, M. D	City physician.
Billings	A. E. Stripp, M. D	City health officer.
Butte	Frank J. Williams, M. D	Do.
Great Falls	*F. L. Watkins, M. D	Health officer.
Helena	C. F. Jump, M. D	City health officer.
Missoula	*F. D. Pease, M. D	Health officer.
Nebraska:		
Beatrice	J. R. Leibee, M. D	City physician.
Fremont	Richard T. Van Metre, M. D	Do.
Grand Island	John G. Woodin, M. D	Do.
Hastings	J. W. Brown, M. D	Do.
Lincoln	*M. F. Arnholt, M. D	Superintendent of health.
Norfolk	Victor L. Siman, M. D	City physician.
North Platte	J. B. Redfield, M. D	Do.
Omaha	F. H. Kinyoun, M. D	Health commissioner.
Nevada:		
Reno	John J. Sullivan, M. D	Secretary, city board of health.
New Hampshire:		
Berlin	*John C. Greenan	Health officer.
Claremont	William P. Prescott	Do.
Concord	*Travis Pollard Burroughs, M. D., C. P. H.	Sanitary officer.
Dover	*George E. Brennan	Health officer.
Keene	*Evan Carpenter White	Do.
Laconia	E. J. Gage, M. D	Secretary, board of health.
Manchester	*Howard A. Streeter, M. D	Health officer.
Nashua	*Leon A. Sylvester, M. D	Do.
Portsmouth	L. R. Hazzard, M. D	Do.
Rochester	Charles E. Goodwin	Do.
New Jersey:		
Asbury Park	*B. H. Obert	Health officer and registrar of vital statistics.
Atlantic City	Samuel L. Salasin, M. D	Health officer.
Bayonne	William W. Brooke, M. D	Do.

City health officers, 1936—Continued

City	Name of health officer	Official title
New Jersey—Continued		
Belleville	*Eugene T. Berry	Health officer.
Bloomfield	*Joseph O. Saile, Ph. G., D. V. S., D. O.	Do.
Bridgeton	*John G. Robbins	Sanitary inspector.
Burlington	*Kathryn C. Phillips	Health officer.
Camden	*A. L. Stone, M. D	Director of public health.
Carteret		
Cliffside Park	Frederick J. Dyer	Health officer.
Clifton	Lester Foye Moloney, M. D	Do.
Collingswood	Harold K. Eynon, M. D	Do.
Dover	*John G. Taylor	Do.
East Orange	*Frank J. Osborne, B. S. in P. H.	Health officer and registrar of vital statistics.
Elizabeth	*Louis J. Richards, S. B. in S. E.	Health officer.
Englewood	*H. R. H. Nicholas	Do.
Garfield	Charles B. Bleasby, M. D	Do.
Gloucester City	J. Alonzo Boek, M. D	Do.
Hackensack	*L. Van D. Chandler	Do.
Harrison	*John T. McClure	Do.
Hawthorne	T. J. Emberton Holmes, M. D	Sanitary inspector.
Hoboken	J. F. X. Stack, M. D	Health commissioner.
Irvington	*William S. Bailey	Health officer.
Jersey City	*Dennis J. Sullivan	Do.
Kearny	*Amos Field, Jr	Do.
Linden	*Maldie E. Noe	Do.
Lodi		
Long Branch	*R. C. Errickson	Do.
Millville	Richard H. Knowles, Ph. G	Do.
Montclair	*Carl T. Pomeroy, C. P. H	Do.
Morristown	*John F. Kilkenny	Do.
New Brunswick	E. Irving Cronk, M. D	Health officer and registrar of vital statistics.
Newark	*Charles Vaughan Craster, M. D., D. P. H.	Health officer.
Nutley	*Richard V. Fellers	Health officer and registrar of vital statistics.
Orange	W. M. Brien, M. D	Do.
Passaic	John N. Ryan, M. D	Health officer.
Paterson	*Frederick P. Lee, M. D	Do.
Perth Amboy	*Chas. S. Thompson, D. V. S	Do.
Phillipsburg	William Dana Pursel, D. D. S., M. D.	Town physician.
Plainfield	*Andrew J. Krog	Health officer.
Pleasantville	Robert M. Grier, M. D	Health inspector.
Rahway	*Fred M. Williams	Health officer and registrar.
Red Bank	Wm. H. Lawes	Sanitary inspector.
Ridgefield Park	*William F. Reynolds, D. V. M.	Health officer.
Ridgewood	J. F. Benjamin, M. D	Do.
Roselle	Perry Alexander Proudfoot, M. D.	Do.
Rutherford	*Marino Dunn	Do.
South Orange	A. C. Benedict, M. D	Do.
South River	A. A. Pansey, M. D	Do.
Summit	Henry Paul Dengler, M. D	Executive officer.
Trenton	*Alton S. Fell, M. D	Director of public welfare and health officer.
Union City	Grant P. Curtis, M. D	Health officer.
West New York		
West Orange	Kurt William Thum, M. D	Director of health.
Westfield	*Andrew Carney	Executive officer.
New Mexico:		
Albuquerque	*James R. Scott, Ph. D., M. D	District health officer.
Roswell	W. W. Phillips, M. D	Assistant district health officer.
Santa Fe	*Elroy Francis McIntyre, M. D	District health officer.
New York:		
Albany	*Daniel V. O'Leary, M. D	Commissioner of health.
Amsterdam	P. J. Fitzgibbons, M. D	Health commissioner.
Auburn	*John W. Copeland, M. D	Do.
Batavia	Emery F. Will, M. D.	Health officer.
Beacon	Charles B. Dugan, Ph. B., M. D.	Do.
Binghamton	Chalmer J. Longstreet, M. D	Do.
Buffalo	*Francis E. Fronczak, LL. D., M. D., Dr. Sc. P. H.	Health commissioner.
	*Edward Durney, M. D	Deputy health officer.
	*Charles A. Bentz, M. D	Do.
Division of child hygiene	*Edward Durney, M. D	Director.
Communicable disease and division of laboratories.	*Charles A. Bentz, M. D	Do.
Division of vital statistics	*Delmer E. Batcheller	Registrar of vital statistics
Division of sanitation	*Frank E. Trumble	Assistant chief inspector.
Division of smoke abatement.	do.	Do.

City health officers, 1936—Continued

City	Name of health officer	Official title
New York—Continued.		
Buffalo—Continued.		
Division of food inspection	*Willard B. Diebold	Assistant chief inspector.
J. N. Adam Memorial Hospital (Perrysburg, N. Y.)	Horace Lo Grasso, M. D	Superintendent.
Cohoes	E. M. Bell, M. D., P. H. D	Commissioner of health.
Corning	Henry E. Elwood, Jr., M. D	Health officer.
Cortland	*Merle R. French, M. D	County commissioner of health.
Dunkirk	Edgar Bieber, M. D	Health officer.
Elmira	Reeve B. Howland, M. D	Do.
Endicott	Mark W. Welch, M. D	Do.
Floral Park	Arthur E. Goldfarb, M. D., C. P. H.	Do.
Freeport	William H. Runcie, M. D	Do.
Fulton	Harold F. McGovern, M. D	Health officer and city physician.
Geneva	C. W. Grove, M. D	Health officer.
Glen Cove	Joseph B. Conolly, M. D	Do.
Glens Falls	*Virgil D. Selleck, M. D., C. P. H.	Do.
Gloversville	Alex. L. Johnson, M. D	Do.
Hempstead	William H. Runcie, M. D	Do.
Herkimer		
Hornell	George E. Taylor, M. D	Do.
Hudson	*Louis Van Hoesen, M. D	Commissioner of health.
Ithaca	*Lowell T. Genung, M. D	Health officer.
Jamestown	William M. Sill, M. D	Superintendent of public health.
Johnson City	Rollin O. Crosier, M. D	Health officer.
Johnstown	Guy Vail Wilson, M. D	Commissioner of public health and welfare.
Kenmore	E. R. Linklater, M. D	Health officer.
Kingston	Lester E. Sanford, M. D	Do.
Lackawanna	A. S. Culkowski, M. D	Do.
Little Falls	A. B. Santry, M. D	Do.
Lockport	Lyman H. Wheeler, M. D	Health officer and city physician.
Lynbrook	F. Maxwell Galloway, M. D	Health officer.
Mamaroneck	Edward M. Clark, M. D	Do.
Massena	C. E. Elkins, M. D	Do.
Middletown	*H. J. Shelley, M. D	Do.
Mount Vernon	*F. W. Shipman, M. D	Commissioner of health.
New Rochelle	*Bertrand F. Drake, M. D., Dr. P. H.	Health officer.
New York	*John L. Rice, M. D	Commissioner of health.
	*William H. Best, M. D	Deputy commissioner of health.
	*George T. Palmer, Dr. P. H	Do.
	*Sol Pincus, C. E	Do.
Bureau:		
General administration	*Maurice G. Postley	Secretary.
Records	*Thomas J. Duffield	Director.
Sanitation	*John Oberwager, M. D	Do.
Preventable diseases	*Victor Mildenberg, M. D	Acting director.
Child hygiene	*Jules Blumenthal, M. D., Dr. P. H.	Director.
School hygiene	*Elwood S. Morton, M. D	Do.
Nursing	*Miss Amelia H. Grant, R. N	Do.
Public health education	*Charles F. Bolduan, M. D	Do.
Laboratories	*Ralph S. Muckenfuss, M. D	Acting director.
Food and drugs	*Abraham Lichterman	Do.
District health administration.	*Margaret W. Barnard, M. D., Dr. P. H.	Director
Tuberculosis	*Herbert R. Edwards, M. D	Do.
Social hygiene	*Walter Clarke, M. D	Do.
Newburgh	Thomas J. Burke, M. D	Health officer
Niagara Falls	E. E. Gillick, M. D	Do.
North Tonawanda	Henry C. Lapp, M. D	Do.
Ogdensburg	F. E. Clark, M. D	Do.
Olean	Joseph P. Garen, M. D	Do.
Oneida	Edmund L. Finley, M. D	Do.
Oneonta	E. P. Hall, M. D	Do.
Ossining		
Oswego	James E. Mansfield, M. D	Do.
Peekskill	J. Douglas Barry, M. D	Do.
Plattsburg	Leo F. Schiff, M. D	Do.
Port Chester	Wm. J. Sheehan, M. D	Do.
Port Jervis	G. Otto Pobe, M. D	City health officer.
Poughkeepsie	*William H. Conger, M. D	Health officer.
Rensselaer	Charles Howard Harbinson, M. D.	Do.
Rochester	*Arthur M. Johnson, M. D	Do.
Rockville Center	Arthur D. Jaques, M. D	Health commissioner.
Rome	Lewis N. Eames, M. D	Health officer.
Saratoga Springs	Frederic J. Resseguie, M. D	Do.
Schenectady	Robert A. MacTaggart, M. D	Acting commissioner of health.

City health officers, 1936—Continued

City	Name of health officer	Official title
New York—Continued.		
Syracuse	*Gregory D. Mahar, M. D	Commissioner of health.
Tonawanda	R. H. Wilcox, M. D	Health officer.
Troy	James H. Flynn, M. D	Commissioner of health.
Utica	*Hugh H. Shaw, M. D	Health officer.
Valley Stream	John M. Quinn, M. D	Do.
Watertown	George B. Van Doren, M. D	Do.
Watervliet	Chas. A. Birmingham, M. D	Do.
White Plains	*Matthias Nicoll, Jr., M. D	County commissioner of health.
Yonkers	*Louis V. Waldron, M. D	Commissioner of health.
North Carolina:		
Asheville	*John W. Williams, M. D., C. P. H.	Director of public health.
Charlotte	*G. L. Rea, M. D	Health commissioner.
Concord	*Daniel Greenlee Caldwell, M. D	City and county health officer.
Durham	*Jesse H. Epperson	Superintendent of health.
Elizabeth City	Thomas S. McMullan, M. D	Health officer.
Fayetteville	*Malolm Tennyson Foster, M. D., C. P. H.	Do.
Gastonia	L. N. Patrick, Phar. D., M. D	City health officer.
Goldsboro	*S. B. McPheeters, M. D., C. P. H.	Director, county health department.
Greensboro	*C. Curtis Hudson, M. D	Health officer.
High Point	Wm. J. McAnally, M. D	Do.
Kinston	*Z. V. Moseley, M. D	County health officer.
New Bern	*John S. Anderson, M. D	Do.
Raleigh	*A. C. Bulla, M. D	Superintendent of health.
Rocky Mount	*James Allen Whitaker, M. D., C. P. H.	Superintendent, health department.
Salisbury	*Charles W. Armstrong, M. D	Health officer.
Shelby	J. S. Dorton, D. V. M	Health officer and meat inspector.
Statesville	Ross S. McElwee, M. D	County physician.
Thomasville	*G. C. Gambrell, M. D	County health officer.
Wilmington	*A. H. Elliott, M. D	Do.
Wilson	*W. H. Anderson, M. D	Health officer.
Winston-Salem	*R. L. Carlton, M. D	City health officer.
North Dakota:		
Bismarck	Albert M. Fisher, M. D	Do.
Fargo	*H. J. Skarshaug, M. D	Do.
Grand Forks	E. C. Haagensen, M. D	Health officer.
Minot	J. L. Devine, M. D	Do.
Ohio:		
Akron	*Melville D. Ailes, LL. B., M. D	Director of health.
Alliance	G. O. Rowland, M. D	Health commissioner.
Ashland	Robert P. Bogniard, M. D	Director of welfare.
Ashtabula	James H. Park, M. D	Health officer.
Barberton	H. A. Finefrock, M. D	Health commissioner.
Bellaire	W. J. Shepard, M. D	City health commissioner.
Bucyrus	W. G. Carlisle, M. D	Health commissioner.
Cambridge	Carl M. Osho	City health commissioner.
Campbell	James S. Mariner, M. D	Health commissioner.
Canton	Frank M. Sayre, M. D	Do.
Chillicothe	*R. E. Bower, Ph. B., M. D	Do.
Cincinnati	*F. K. Harder, M. D	Acting health commissioner.
Cleveland	*Harold J. Knapp, M. D	Commissioner.
Division:		
Communicable diseases	*T. G. Duncan, M. D	Chief.
Venereal diseases	*E. J. Braun, M. D	Do.
Tuberculosis	E. P. Edwards, M. D	Do.
Child hygiene	*R. J. Oehsner, M. D	Do.
School health service	*J. G. Smith, M. D	Do.
Food and drug administration.	*E. B. Buchanan	Do.
Laborotories	Emerson Megrail, M. D	Consulting laboratory director.
	*Wm. H. Hay, LL. B	Assistant laboratory director.
Public health nurses	*Cora M. Templeton, R. N	Director.
Vital statistics	*Sara B. Hartley	Chief.
Cleveland Heights	*Robert Lockhart, M. D	Director of health.
Columbus	*Nelson C. Dysart, Ph. C., M. D	Health commissioner.
Coshocton	J. D. Lower, M. D	City health commissioner.
Cuyahoga Falls	*R. H. Markwith, M. D	Commissioner of health.
Dayton	*A. O. Peters, M. D	Do.
East Cleveland	George W. Stober, M. D	Director of health.
East Liverpool	Roy C. Costello, M. D	Health commissioner.
Elyria	George E. French, M. D	Do.
Euclid	*Robert Lockhart, M. D	District health commissioner.
Findlay	*Miss Martha Laffey, R. N	Health commissioner.
Fostoria	*H. A. DeVore	Do.
Fremont	E. L. Vermilya, M. D	Do.
Garfield Heights	*Robert Lockhart, M. D	County health commissioner.
Hamilton	*C. J. Baldridge, B. L., M. D	Health commissioner.
Ironton	Harry Sherwood Allen, M. D	Do.

City health officers, 1936—Continued

City	Name of health officer	Official title
Ohio—Continued.		
Lakewood	Wallace J. Benner, M. D.	Health commissioner.
Lancaster	Clifford B. Snider, B. S. in Agr., M. D.	Do.
Lima	James B. Poling, M. D.	Do.
Lorain	Valloyd Adair, M. D.	Do.
Mansfield	*M. C. Hanson, M. D., Dr. P. H.	Do.
Marietta	F. S. McGee, M. D.	Do.
Marion	M. M. Weinbaum, M. D.	Do.
Martins Ferry	*John Donovan	Do.
Massillon	*Dwight L. Fisher	Do.
Middletown	*George D. Lummis, M. D.	Do.
New Philadelphia	*Joseph Blickensderfer, M. D.	Do.
Newark	*W. H. Knauss, M. D.	Do.
Niles	W. A. Werner, M. D.	Do.
Norwood	Ralph E. Hatfield, M. D.	Do.
Painesville	*Mrs. Clara Carter Wilder, R. N.	Do.
Parma		
Piqua	F. Robert Buechner	Do.
Portsmouth	*Floyd R. Stamp, D. O., M. D.	County health commissioner.
Salem	Raymond T. Holzbach, M. D.	Health commissioner.
Sandusky	*F. M. Houghtaling, M. D.	Do.
Shaker Heights	Paul Marcus Spurney, M. D.	Director of health.
Springfield	*Oscar M. Craven, M. D.	Director of public health.
Steubenville	*Julius A. Pizzoferrato	Health commissioner.
Struthers	Charles Scofield, M. D.	County health commissioner.
Tiffin	J. A. Gosling, M. D.	Health commissioner.
Toledo	Basil B. Brim, M. D.	Do.
Warren	M. T. Knappenberger, M. D.	Do.
Wooster	*James T. Duncan, M. D.	Acting health commissioner.
Xenia	A. D. DeHaven, M. D.	Health commissioner.
Youngstown	Wallace W. Ryall, M. D.	Do.
Zanesville	D. G. Candy, M. D.	Superintendent of health and sanitation.
Oklahoma:		
Ada	S. P. Ross, M. D.	City health officer.
Ardmore	A. Y. Easterwood, M. D.	City physician.
Bartlesville	Elizabeth Chamberlin, M. D.	City superintendent of health.
Chickasha	S. O. Marrs, M. D.	Do.
Enid	R. C. Baker, M. D.	Do.
Lawton	*Kenneth P. Cash	City chemist.
McAlester	*Benj. B. Kies, M. D.	County superintendent of health.
Muskogee	James T. Nichols, M. D.	City superintendent of health.
Oklahoma City	*Walter H. Miles, M. D.	Director of health.
Okmulgee	*C. E. Donerse	Sanitary officer.
Ponca City	*C. C. Gardner, M. D.	City health director.
Sapulpa	A. C. Frampton	City health inspector.
Seminole	*George Hunter, M. D.	County superintendent of health.
Shawnee	T. D. Rowland, M. D.	City health officer.
Tulsa	J. Jeff Billington, M. D.	Superintendent of health.
Wewoka	*George Hunter, M. D.	County superintendent of health.
Oregon:		
Astoria	Nellie S. Vernon, M. D.	City and county health officer.
Eugene	*Alstrup N. Johnson, M. D.	County public health officer.
Klamath Falls	*Neil Black, M. D.	County health officer.
Medford	L. D. Inskeep, M. D.	City health officer.
Portland	*John G. Abele, M. D.	Do.
Salem	*Vernon A. Douglas, M. D.	City-county health officer
Pennsylvania:		
Aliquippa	*J. E. Tanner	Health officer.
Allentown	*J. Treichler Butz, D. D. S., M. D.	Do.
Altoona	*Raymond A. Herbert	Superintendent of health.
Ambridge	*Louis Herrmann	Health officer.
Arnold	Frank E. Morrison	Secretary, board of health.
Beaver Falls	*H. B. Plummer	Health officer.
Bellevue	*Goldie P. Brown	Do.
Berwick	*Charles Ross	Do.
Bethlehem	Francis J. Conahan, M. D.	City physician.
Braddock	*James E. Wills	Health officer.
Bradford	*R. G. Vogel	Do.
Bristol	John M. Wright	Do.
Butler	A. M. Rensel	Superintendent of public safety.
Canonsburg		
Carbondale	*Arthur John Dearie	Health officer.
Carlisle		
Carnegie	Arthur B. Lafferty	Borough clerk.
Chambersburg	*Frank J. Croft	City health officer.
Charleroi	*J. M. Hill	Health officer.
Chester	*Timothy McCarey	Do.
Clairton	*W. F. Connolly	Do.
Coatesville	Charles V. Peace, V. M. D.	Do.

City health officers, 1936—Continued

City	Name of health officer	Official title
Pennsylvania—Continued.		
Columbia		
Connellsville	J. W. Goldsmith	Health officer.
Conshohocken	Thomas S. White	Health officer and secretary
Coraopolis	*D. K. Clever, M. D.	Health officer.
Dickson City	Joseph Malinoski	Secretary, board of health.
Donora	*Herman Lang	Health officer.
Dormont	Fred W. Frank	Do
Du Bois	J. I. Brockbank, M. D.	Do.
Dunmore	*William Ferrese	Do.
Duquesne	*Francis P. Long	Sanitary police officer.
Easton	R. S. Raub, M. D.	Health officer.
Ellwood City	*Lewis Young	Do.
Erie	*James R. Smith, M. D.	Do.
Farrell	*Benjamin Davis	Do.
Franklin		
Greensburg	*Joseph B. Cherry	Health officer-secretary.
Hanover	Nevin H. Seitz, M. D.	Secretary, board of health.
Harrisburg	John M. J. Raunick, M. D.	Health officer.
Hazleton	*William Pfaff	Do.
Homestead		
Jeannette	*Chas. E. Walter	Chief health officer.
Johnstown	L. W. Jones, M. D.	City health officer.
Kingston	*J. F. Seward	Health officer.
Lancaster	*Benj. F. Charles	Do.
Latrobe	W. T. Osborne	Do.
Lebanon	C. Ray Bell, Jr., M. D.	Do.
Lewistown	*Floyd H. Reinecker	County health officer.
McKeesport	*Daniel F. Marsh	Health officer.
McKees Rocks	*John Driscoll	Do.
Mahanoy City	*Wm. L. Walker	Do.
Meadville	*John Laley	City health officer.
Monessen	*Francis C. Duvall, M. D.	Do.
Mount Carmel	*Howard Zieger	Health officer.
Munhall	*Charles Watt	Do.
Nanticoke	*H. Judd Abbott	Do.
New Castle	William L. Steen, M. D.	Do.
New Kensington	*John H. Evans	Do.
Norristown	*J. Cleve Cassel	Secretary and health officer.
North Braddock	*Michael J. Pastor	Health officer.
Oil City	*William J. Lewis	Do.
Old Forge	Primo Cesere	Chief of police.
Olyphant		
Philadelphia:		
Department of public health.	*Wm. C. Hunsicker, M. D.	Director, department of public health.
	*Alfred F. Allman, M. D.	Assistant director, department of public health.
Bureau of health	*William J. Wolf	Secretary.
Bureau of hospitals:		
Philadelphia General Hospital, 34th and Pine Streets.	*William G. Turnbull, M. D.	Superintendent.
Philadelphia Hospital for Contagious Diseases, 2d and Luzerne Streets.	*Pascal F. Lucchesi, M. D.	Acting superintendent.
Philadelphia Hospital for Mental Diseases, Byberry.	*Wilbur P. Rickert, M. D.	Superintendent.
Phoenixville	*Russell E. Deery	Health officer.
Pittsburgh	*Ray P. Moyer, Ph. G., M. D.	Director.
Bureau of infectious diseases (including municipal and tuberculosis hospitals).	*P. E. Marks, M. D.	Superintendent.
Bureau of sanitation	*George W. Schusler, C. E.	Do.
Bureau of child welfare	*H. J. Benz, M. D.	Do.
Bureau of food inspection	*Howard Patton	Do.
Bureau of smoke regulation.	H. B. Meller, C. E.	Do.
Pittston	*Michael A. McHale	Health officer.
Plymouth	H. G. Templeton, M. D.	Do.
Pottstown	*A. John André	Do.
Pottsville	*A. C. Huntzinger	Do.
Reading	*Ira J. Hain, M. D.	Do.
Scranton	Arthur E. Davis, M. D.	Director, department of health.
Shamokin	*Frederick Zeiser	Health officer.
Sharon	*J. S. Hildebrand	Sanitary officer.
Shenandoah	*Claud R. D[illegible]s, Ph. G.	Health officer.
Steelton	*E. G. Butler	Do.
Sunbury	*Carl P. Inkrote	City health officer.
Swissvale	*Samuel L. Glasgow	Health officer.

City health officers, 1936—Continued

City	Name of health officer	Official title
Pennsylvania—Continued.		
Tamaqua	Lamont Perrine	Health officer.
Taylor	E. E. Edwards, M. D	Do.
Turtle Creek	*Manuel Emmanuel	Do.
Uniontown	*W. C. Hall	City health officer.
Vandergrift	J. D. Remaley	Health officer.
Warren	*R. N. Brown	Do.
Washington	*C. E. Houston	Do.
Waynesboro	Mrs. Verne L. Snowberger	Do.
West Chester	Warren T. Garrett	Do.
Wilkes-Barre	*Charles B. Crittenden, M. D	City health officer.
Wilkinsburg	*J. M. Snyder	Health officer.
Williamsport	*William J. Mollenkopf	Do.
York	John D. Yeagley, M. D	Director of public health.
Rhode Island:		
Bristol	John Cardoza	Health officer.
Central Falls	Charles H. Boucher, M. D	Do.
Cranston	Daniel S. Latham, M. D	Superintendent of health.
East Providence	William H. T. Hamill, M. D	Health officer.
Newport	Edward V. Murphy, M. D	Commissioner of health.
North Providence	Mario Lorenzo Palmieri, M. D	Health officer.
Pawtucket	Albert L. Vandale, M. D	Superintendent of health.
Providence	*Michael J. Nestor, M. D	Do.
Warwick	*William H. Dyer, M. D	Do.
West Warwick	Daniel S. Harrop, M. D	Health officer.
Westerly	Samuel C. Webster, Ph. G., M. D.	Do.
Woonsocket	James P. O'Brien, M. D	Do.
South Carolina:		
Anderson	E. E. Epting, M. D	City health officer.
Charleston	*Leon Banov, M. D	Health officer.
Columbia	P. E. Payne, M. D	City health officer.
Florence	*George D. Heath, M. D., Dr. P. H.	Health commissioner.
Greenville	*Irving Sydnor Barksdale, M. D	Do.
Greenwood	*Joseph E. Brodie, M. D	County health officer.
Rock Hill	Roy D. Sumner, M. D	City physician.
Spartanburg		
Sumter	*G. R. Kitchen, D. V. M	City health officer.
South Dakota:		
Aberdeen	J. F. Adams, M. D	Health officer.
Huron	T. J. Wood, M. D	City health officer.
Mitchell	E. M. Young, M. D	Do.
Rapid City	Ray E. Lemley, M. D	Health officer and county physician.
Sioux Falls	Emil G. Ericksen, M. D	Health officer.
Watertown	W. G. Magee, M. D	Do.
Tennessee:		
Bristol	*F. L. Moore, M. D., C. P. H	County health officer.
Chattanooga	*John W. L. Cooper, M. D	Director of health.
Jackson	Herman Hawkins, M. D	City physician.
Johnson City	*Wallace L. Poole, M. D., M.P.H.	Director, city and county health departments.
Kingsport	*F. L. Moore, M. D., C. P. H	Director, county health department.
Knoxville	*William H. Enneis, M.D., M.P.H.	Health officer.
Memphis	*Lloyd M. Graves, M. D	Superintendent of health.
Nashville	*John Overton, M. D	City health officer.
Texas:		
Abilene	Scott W. Hollis, M. D	County and city health officer.
Amarillo	*B. M. Primer, M. D., M. P. H	Director of health unit.
Austin	*Eugene O. Chimene, M. D	Director of public health.
Beaumont	W. W. Dunn, M. D	Health officer.
Big Spring	M. H. Bennett, M. D	City health officer.
Brownsville	Thurman Archer Kinder, Jr., M. D.	Do.
Brownwood	J. M. Horn, M. D	Do.
Cleburne	Joseph M. Stallcup, M. D	Do.
Corpus Christi	E. T. Bickley, M. D	Do.
Corsicana	William Thomas Shell, Jr., M. D.	Do.
Dallas	*J. W. Bass, M. D	Director of public health.
Del Rio	D. A. York, M. D	City health officer.
Denison	W. A. Lee, M. D	Do.
El Paso	*T. J. McCamant, M. D	Director, city-county health unit.
Fort Worth	*Arthur Heath Flickwir, M. D	Director, public health and welfare.
Galveston	Walter Kleberg, M. D	City health officer.
Greenville	John Saunders Cooper, M. E., M. D.	Do.
Harlingen	V. M. Bass, M. D	Do.
Houston	*George Washington Larendon, M. D.	Director of public health.
Laredo		
Lubbock	J. W. Rollo, M. D	Health officer.
Marshall	W. H. Bennett, M. D	City health officer and food inspector.
Palestine	J. M. Colley, M. D	City health officer.
Pampa		

City health officers, 1936—Continued

City	Name of health officer	Official title
Texas—Continued.		
Paris	J. A. Stephens, M. D.	Health officer.
Port Arthur	Frank Joseph Beyt, M. D.	City health officer.
San Angelo	B. T. Brown, M. D.	Do.
San Antonio	*W. A. King, M. D.	Do.
San Benito	Neal D. Monger, M. D.	Do.
Sherman	Arthur Gleckler, M. D.	City physician.
Sweetwater	*Ernest W. Prothro, M. D.	Director of health.
Temple		
Texarkana	Charles Adna Smith, M. D.	City health officer.
Tyler	Albert Woldert, Phg. G., M. D.	Do.
Waco	*George M. Liddell, M. D.	Do.
Wichita Falls	*John H. Fletcher, M. D.	Do.
Utah:		
Ogden	W. J. Wilson, M. D.	Health commissioner.
Provo	Charles M. Smith, M. D.	City physician.
Salt Lake City	T. J. Howells, M. D.	Health commissioner.
Vermont:		
Barre	J. J. Tomasi, M. D.	Health officer.
Bennington		
Burlington	E. F. Foster, M. D.	City health officer.
Rutland	*C. M. Cole	Health officer.
Virginia:		
Alexandria	W. Lewis Schafer, M. D.	Health officer and clinician.
Charlottesville	*Robert Dewey Hollowell, M. D.	City-county health departments.
Danville	*R. W. Garnett, M. D.	Health officer and director of public welfare.
Hopewell	L. A. Sims, C. E.	City engineer.
Lynchburg	*Mosby G. Perrow, Ph. D.	Director of public welfare.
Newport News	*G. Colbert Tyler, M. D.	Health officer.
Norfolk	*John Carey Sleet, M. D.	Health commissioner.
Petersburg	Mason Romaine, M. D.	Health officer.
Portsmouth	*Lonsdale J. Roper, M. D.	Director of Public welfare.
Richmond	*W. Brownley Foster, M. D.	Do.
Roanoke	*Coleman Bernard Ransone, M. D.	Health officer.
Staunton	T. M. Parkins, M. D.	Do.
Suffolk	*William F. Wild, M. D., C. P. H.	Director of health.
Winchester	L. M. Allen, M. D.	Health officer.
Washington:		
Aberdeen	B. O. Swinehart, M. D.	City health officer.
Bellingham		
Bremerton	D. H. Polk, M. D.	Do.
Everett	J. Walton Darrough, M. D.	Do.
Hoquiam	Harry C. Watkins, M. D.	Do.
Longview	J. S. McCarthy, M. D.	Do.
Olympia	*B. D. Holland, M. D.	County health officer.
Port Angeles	Wm. H. Taylor, M. D.	City health officer.
Seattle	*Frank M. Carroll, M. D.	Commissioner of health.
Spokane	*Ralph Hendricks, M. D.	Commissioner of public affairs and health officer.
Tacoma	S. M. Creswell, M. D.	Director of health.
Vancouver	*Clyde B. Hutt, M. D.	City and county health officer.
Walla Walla	J. E. Vanderpool, M. D.	County-city health officer.
Wenatchee	*C. R. Fargher, M. D.	City-county health officer.
Yakima	*Lloyd Moffitt, M. D.	Health officer.
West Virginia:		
Bluefield	*David B. Lepper, M. D., C. P. H.	City health director.
Charleston	*Hugh B. Robins, M. D.	Health commissioner.
Clarksburg	*Robert Linn Osborn, M. D.	City physician.
Fairmont	L. N. Yost, Ph. G., M. D.	County health officer.
Huntington	Gilbert A. Ratcliff, M. D.	Public health director.
Martinsburg	*Claude A. Thomas, M. D.	County health officer.
Morgantown	*R. C. Farrier, M. D.	City and county health officer.
Moundsville	*Wm. G. C. Hill, Ph. G., M. D.	Health director.
Parkersburg	*Arthur D. Knott, M. D., D. P. H.	City and county health officer.
Wheeling	*Reece M. Pedicord, M. D.	City-county health commissioner.
Wisconsin:		
Appleton	John C. Troxel, M. D.	Health commissioner.
Ashland	C. O. Hertzmann, M. D.	Do.
Beloit	R. S. Vivian, M. D.	Health officer.
Cudahy	C. D. Partridge, B. S. in Chem., M. D.	Commissioner of health.
Eau Claire	L. H. Flynn, M. D.	Health officer.
Fon du Lac	*Ewald H. Pawsat, M. D.	Health commissioner.
Green Bay	Henry S. Atkinson, M. D.	City physician and health commissioner.
Janesville	*Fred B. Welch, M. D.	City health officer.
Kenosha	*G. Windesheim, M. D.	Director of health.
La Crosse	*Anthony M. Murphy	Health officer.
Madison	*F. F. Bowman, B. L., M. D.	Health officer.

City health officers, 1936—Continued

City	Name of health officer	Official title
Wisconsin—Continued.		
Manitowoc	George M. Hoffman, Ph. G., M. D.	Health officer.
Marinette	J. William Boren, M. D	Health commissioner.
Milwaukee	John P. Koehler, M. D	Commissioner of health.
	E. V. Brumbaugh, M. D	Deputy commissioner of health.
School hygiene division	*George P. Barth, M. D	Director.
Division of venereal diseases.	*William J. McKillip, M. D	Do.
Vital statistics	*George E. Adams	Deputy register.
Division of tuberculosis	*George R. Ernst, M. D	Director.
Contagious disease division.	*Robert E. Hickey, M. D	Do.
Division of food and sanitary inspection.	*Stanley L. Pilgrim, M. D. C	Do.
Bureau of laboratories	*R. W. Cunliffe	Do.
Division of child welfare	*E. V. Brumbaugh, M. D	Do.
Division of nurses	*Alma H. Brunk, R. N	Do.
Oshkosh	*Irvin A. Ihrke, M. D	Health commissioner.
Racine	*I. F. Thompson, M. D., M. P. H.	Do.
Sheboygan	*Gustav J. Hildebrand, M. D	Do.
Shorewood	Jerome M. Jekel, M. D	Do.
South Milwaukee		
Stevens Point	Ferdinand R. Krembs, M. D	Health officer.
Superior	*Charles H. Mason, M. D	Do.
Two Rivers	Alfred P. Zlatnik, M. D	Commissioner of health.
Watertown	Emmett W. Bowen, M. D	Do.
Waukesha	Frank M. Scheele, M. D	Do.
Wausau	*L. F. Bugbee	City health officer.
Wauwatosa	Roy T. Hanser, M. D	Health commissioner.
West Allis	*Frank H. Russell, M. D	Do.
Wyoming:		
Casper	J. C. Kamp, M. D	County health officer.
Cheyenne	W. R. Day, M. D	Do.

COURT DECISION ON PUBLIC HEALTH

City ordinance regulating manufacture and sale of mattresses upheld.—(Michigan Supreme Court; *People* v. *Dushkin*, 268 N. W. 765; decided Sept. 2, 1936.) An ordinance of the city of Detroit relating to mattresses defined "secondhand material" as "(1) Any material which has been used in the manufacture of another article or used for any other purpose; (2) Any material made into thread, yarn, fabric, matting padding, or scraps of the same, and subsequently torn, shredded, picked apart, or otherwise disintegrated." It was also provided by the ordinance that "No person within the corporate limits of the city of Detroit, in making or manufacturing a mattress shall use any secondhand material which, since last used or manufactured, shall not have been previously sterilized by a process approved by the Board of Health of the City of Detroit."

The defendant was charged with violating the ordinance and, on appeal from a conviction, claimed that the ordinance was void in prohibiting, without sterilization, the manufacture of mattresses which were not for sale in the city.

The court stated that the general power of the city to preserve public health and regulate trades was granted by the Home Rule Act and the city charter adopted thereunder, that the ordinance was a health measure, and that it was a legitimate, municipal purpose to

prevent the spread of infectious, contagious, or other diseases among workers in the factory as well as the public at large. Proceeding, the court said:

The place of sale of the mattresses has no connection with danger to the workmen manufacturing them, nor does it prevent a workman carrying infection contracted in the factory to the public. Consequently, it is not an unreasonable exercise of the granted or police powers of the city to require sterilization of all goods manufactured. Moreover, such requirement is not unreasonable because of the inability of the officers to trace individual sales.

We think the ordinance in this respect is a valid exercise of municipal power.

As to one mattress, the defendant contended that it was not made of secondhand materials. There was testimony that the mattress was filled with "shoddy", which might be old or new but which was apparently old, and, on the other hand, there was evidence that the filling was known as "smak" and consisted of the waste of clippings from bolts of cloth in the cutting out and manufacturing of clothing and which was shredded by a process which also sterilized it. Regarding this, it was stated in the opinion as follows:

The definition of "secondhand material" in the ordinance is not objectionable, even though there may be instances of harmless and substantially new material coming within its scope. The council has the power to adopt a reasonable classification which would obviate the necessity of tracing materials to their source and to define as secondhand a class which might be, and frequently is, secondhand. Moreover, shoddy or smak, being a species of waste, may be thrown about on the floor or otherwise and become a source of infection. The definition is not unreasonable.

It was held that the evidence justified the conviction, which was affirmed.

DEATHS DURING WEEK ENDED OCTOBER 24, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 24, 1936	Corresponding week, 1935
Data from 86 large cities of the United States.		
Total deaths	8,090	7,692
Deaths per 1,000 population, annual basis	11.3	10.7
Deaths under 1 year of age	561	498
Deaths under 1 year of age per 1,000 estimated live births	51	45
Deaths per 1,000 population, annual basis, first 43 weeks of year	12.1	11.4
Data from industrial insurance companies.		
Policies in force	68,683,[illegible]	67,558,303
Number of death claims	12,654	11,320
Death claims per 1,000 policies in force, annual rate	9.7	8.7
Death claims per 1,000 policies, first 43 weeks of year, annual rate	9.8	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Oct. 31, 1936, and Nov. 2, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 31, 1936, and Nov. 2, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935
New England States:								
Maine	1			17	13	54	1	0
New Hampshire					2		1	0
Vermont	3	2			3	65	0	0
Massachusetts	2	12			66	58	1	1
Rhode Island	1	2			27	36	0	0
Connecticut	2	5		9	12	66	0	0
Middle Atlantic States:								
New York	22	38	[1] 10	[1] 8	60	331	8	5
New Jersey	8	24	12	1	25	10	4	1
Pennsylvania	36	47			32	97	2	6
East North Central States:								
Ohio	48	138	19	48	10	79	3	0
Indiana	31	86	28	23	4	15	5	0
Illinois	35	92	9	12	10	20	5	2
Michigan	24	8	2	3	17	14	0	2
Wisconsin	3	4	15	34	29	57	4	1
West North Central States:								
Minnesota	19	9		1	16	16	0	0
Iowa	4	22	2		3	2	0	1
Missouri	21	83	56	39	3	8	0	5
North Dakota	1	2			1	3	1	0
South Dakota		7			1	7	0	3
Nebraska		13	1		3	22	0	1
Kansas	10	16			2	3	0	0
South Atlantic States:								
Delaware			4		1	53	0	0
Maryland [2]	10	17	6	1	17	19	5	3
District of Columbia	9	24		2	4		4	2
Virginia	58	66			6	38	4	2
West Virginia	21	49	14	9	8	8	2	1
North Carolina [3]	164	102	7	5	15	7	3	4
South Carolina [3]	25	34	192	141	5		1	0
Georgia [3]	44	44				3	1	1
Florida	15	19	5			1	1	0
East South Central States:								
Kentucky	37	52	17	14	20	53	6	0
Tennessee [4]	94	55	70	5	1	3	0	3
Alabama [3]	64	51	26	27	2	4	0	1
Mississippi [2]	15	21					2	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 31, 1936, and Nov. 2, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935
West South Central States:								
Arkansas	12	25	48	14		2	1	1
Louisiana	13	20	5	2	1	3	1	1
Oklahoma [6]	7	16	47	16	6	2	0	2
Texas [3]	63	136	102	103	18	3	0	3
Mountain States:								
Montana	2		4		1		1	1
Idaho	3		3		0	2	0	0
Wyoming	1				2	8	0	2
Colorado	6	15			1	4	1	0
New Mexico	5	4	1		4	8	1	0
Arizona	2	3	33	13	23		0	0
Utah [4]	1				13		1	0
Pacific States:								
Washington	2	3		3	8	67	1	4
Oregon	2	3	31	17	6	120	0	0
California [3]	49	59	26	21	21	111	2	6
Total	997	1,428	795	593	531	1,491	73	74
First 44 weeks of year	21,044	29,109	146,188	109,521	274,513	704,194	6,609	4,867

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935
New England States:								
Maine	2	1	2	21	0	0	1	2
New Hampshire	0	0	3	7	0	0	0	0
Vermont	0	1	4	9	0	0	1	1
Massachusetts	3	28	103	147	0	0	0	1
Rhode Island	0	2	12	15	0	0	0	0
Connecticut	0	7	33	30	0	0	0	2
Middle Atlantic States:								
New York	6	23	238	323	0	0	22	13
New Jersey	0	12	37	81	0	0	2	0
Pennsylvania	9	19	230	298	0	0	35	18
East North Central States:								
Ohio	22	1	226	400	0	2	21	18
Indiana	4	2	85	185	1	1	2	0
Illinois	39	5	243	453	1	2	27	22
Michigan	13	12	187	130	0	0	5	10
Wisconsin	3	1	163	302	6	1	5	5
West North Central States:								
Minnesota	0	1	95	230	4	1	0	0
Iowa	6	0	70	106	10	7	1	1
Missouri	2	2	77	113	1	1	14	1
North Dakota	1	1	33	43	15	2	5	1
South Dakota	0	1	39	31	7	8	0	1
Nebraska	0	0	17	35	4	9	0	0
Kansas	8	2	99	79	0	6	2	6
South Atlantic States:								
Delaware	0	0	4	10	0	0	3	0
Maryland [2]	2	2	51	86	0	0	8	8
District of Columbia	0	1	15	6	0	0	0	0
Virginia	2	2	36	82	0	0	13	7
West Virginia	2	0	79	117	0	1	25	10
North Carolina [3]	1	2	83	85	0	0	8	12
South Carolina [3]	0	0	7	11	0	0	3	7
Georgia [3]	5	0	17	23	0	0	28	9
Florida	1	0	6	6	0	0	0	2
East South Central States:								
Kentucky	2	4	82	95	0	0	40	22
Tennessee [4]	[5] 23	2	46	104	1	0	9	18
Alabama [3]	10	1	23	28	1	0	13	90
Mississippi [2]	2	0	12	18	0	0	8	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 31, 1936, and Nov. 2, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935	Week ended Oct. 31, 1936	Week ended Nov. 2, 1935
West South Central States:								
Arkansas	4	1	11	18	0	1	9	6
Louisiana	0	0	7	15	0	0	11	7
Oklahoma [6]	0	0	22	15	2	2	7	14
Texas [1]	6	2	41	63	0	2	23	34
Mountain States:								
Montana	0	0	33	77	7	3	4	1
Idaho	0	0	29	51	0	0	2	6
Wyoming	0	0	9	31	0	0	0	0
Colorado	1	0	17	144	0	7	4	6
New Mexico	3	0	17	30	0	0	11	19
Arizona	0	1	8	13	0	0	0	1
Utah [2]	0	1	19	58	1	0	0	0
Pacific States:								
Washington	1	0	40	46	3	16	2	6
Oregon	2	2	27	42	1	0	4	3
California [3]	4	11	176	198	0	0	5	5
Total	105	153	2,916	4,554	65	72	388	327
First 44 weeks of year	3,750	9,991	201,619	207,417	6,400	5,758	12,693	15,678

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever cases, week ended Oct. 31, 1936, 53 cases, as follows: North Carolina, 2; South Carolina, 2; Georgia, 20; Alabama, 8; Texas, 14; California, 1.
[4] Rocky Mountain spotted fever, week ended Oct. 31, 1936, Tennessee, 1 case.
[5] Five nonparalytic cases included.
[6] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1936										
North Carolina	14	51	2		31	125	6	57	1	84
Wisconsin	2	9	48		318		0	436	45	11
August 1936										
Arizona	3	10	53	6	60		1	6	0	15
Georgia	3	61	12	1,141	7	41	21	37	0	138
Massachusetts	6	19		1	230	1	7	155	0	13
September 1936										
California	9	157	113	45	163	15	95	483	0	78
Georgia	3	130	43	1,492	2	55	37	43	0	121
Kentucky	25	78	6	15	70		10	133	6	177
Montana	3	11	23		5		3	82	20	34
Nevada			2				1	19	0	0
Virginia	13	109	138	150	23	6	15	58	0	91
West Virginia	11	45	23	3	4		22	136	0	80

July 1936

	Cases
North Carolina:	
Chicken pox	57
German measles	49
Ophthalmia neonatorum	1
Paratyphoid fever	4
Rabies in man	1
Rocky Mountain spotted fever	10
Septic sore throat	8
Tularaemia	1
Typhus fever	4
Undulant fever	1
Whooping cough	160
Wisconsin:	
Chicken pox	712
Epidemic encephalitis	2
German measles	32
Mumps	525
Septic sore throat	3
Trachoma	2
Tularaemia	2
Undulant fever	9
Whooping cough	601

August 1936

	Cases
Anthrax:	
Georgia	1
Chicken pox:	
Arizona	5
Georgia	9
Massachusetts	110
Dysentery:	
Arizona (bacillary)	17
Georgia (amoebic)	10
Georgia (bacillary)	19
Massachusetts (bacillary)	1
Epidemic encephalitis:	
Arizona	1
Massachusetts	1
German measles:	
Arizona	8
Massachusetts	44
Hookworm disease:	
Georgia	205
Leprosy:	
Arizona	1
Mumps:	
Arizona	46
Georgia	72
Massachusetts	207
Ophthalmia neonatorum:	
Massachusetts	88
Paratyphoid fever:	
Georgia	3
Massachusetts	1
Rabies in animals:	
Massachusetts	5
Rabies in man:	
Georgia	1
Septic sore throat:	
Georgia	27
Massachusetts	4
Tetanus:	
Georgia	6
Massachusetts	1
Trachoma:	
Arizona	34
Georgia	3
Massachusetts	5
Trichinosis:	
Massachusetts	5
Tularaemia:	
Georgia	2
Typhus fever:	
Georgia	144
Undulant fever:	
Arizona	4
Georgia	7
Massachusetts	11
Whooping cough:	
Arizona	23
Georgia	57
Massachusetts	533

September 1936

	Cases
Anthrax:	
California	2
Botulism:	
California	2
Chicken pox:	
California	251
Georgia	6
Montana	70
Nevada	26
Virginia	6
West Virginia	8
Conjunctivitis:	
Georgia	6
Dengue:	
Georgia	16
Dysentery:	
California (amoebic)	23
California (bacillary)	53
Georgia (amoebic)	20
Georgia (bacillary)	17
Montana	3
Virginia (amoebic)	1
Virginia (diarrhea included)	697
West Virginia	4
Epidemic encephalitis:	
California	11
Montana	3
Virginia	1
Food poisoning:	
California	81
German measles:	
California	91
Montana	1
Granuloma, coccidioidal:	
California	5
Hookworm disease:	
Georgia	592

September 1936—Continued

	Cases
Jaundice (epidemic):	
California	1
Leprosy:	
California	1
Mumps:	
California	993
Georgia	43
Kentucky	23
Montana	46
Nevada	3
Virginia	34
West Virginia	2
Ophthalmia neonatorum:	
California	1
Virginia	2
Paratyphoid fever:	
California	12
Georgia	4
Virginia	4
West Virginia	1
Rabies in animals:	
California	81
Relapsing fever:	
California	11
Rocky Mountain spotted fever:	
Georgia	1
Virginia	1
Septic sore throat:	
California	11
Georgia	43
Montana	2
Virginia	2
Tetanus:	
California	5
Georgia	1
Virginia	3
Trachoma:	
California	12
Montana	3
Trichinosis:	
California	1
Georgia	1
Tularaemia:	
California	3
Georgia	2
Virginia	1
Typhus fever:	
California	4
Georgia	130
Undulant fever:	
California	20
Georgia	11
Kentucky	3
Montana	2
Virginia	7
Whooping cough:	
California	1,048
Georgia	52
Kentucky	174
Montana	56
Nevada	3
Virginia	122
West Virginia	20

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 24, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	0	2	0	0	1	1	8	29
New Hampshire:											
Concord	0		0	0	2	0	0	0	0	0	7
Manchester	0		0	0	0	0	0	0	0	0	9
Nashua	0			0		0	0		0	0	
Vermont:											
Barre											
Burlington	0		0	0	0	0	0	0	0	1	9
Rutland	0		0	0	2	0	0	0	0	0	9
Massachusetts:											
Boston	1		1	5	19	21	0	7	0	103	187
Fall River	0		0	0	1	0	0	3	0	0	32
Springfield	0		0	0	2	5	0	1	0	5	31
Worcester	0		0	6	6	4	0	0	0	16	52
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	14
Providence	0		0	0	6	13	0	1	0	4	58
Connecticut:											
Bridgeport	0		0	4	1	0	0	1	0	0	33
Hartford	0		0	0	2	15	0	2	4	6	45
New Haven	0		1	0	1	0	0	0	0	5	34
New York:											
Buffalo	0		1	1	12	11	0	10	4	7	143
New York	14	7	4	17	87	60	0	93	15	90	1,452
Rochester	0		0	0	6	3	0	0	0	4	52
Syracuse	0		0	0	0	4	0	0	0	21	34
New Jersey:											
Camden	2		1	0	2	1	0	0	0	1	26
Newark	0		0	0	6	1	0	7	0	32	98
Trenton	0		0	0	3	0	0	2	1	0	32
Pennsylvania:											
Philadelphia	1	3	1	2	34	28	0	33	3	122	446
Pittsburgh	3	1	1	1	13	28	0	9	3	13	147
Reading	0		0	1	1	1	0	1	0	19	28
Scranton	1			0	0	1	0		0	0	
Ohio:											
Cincinnati	6		1	4	6	8	0	11	2	6	124
Cleveland	3	11	3	1	12	16	0	8	1	30	192
Columbus	2		0	0	4	8	0	3	0	3	75
Toledo	2		0	0	6	6	0	2	0	15	64
Indiana:											
Anderson	0		0	0	2	1	0	0	1	9	7
Fort Wayne	0		0	0	0	0	0	0	0	0	18
Indianapolis	0		1	0	12	16	0	0	0	0	96
Muncie	0		0	0	2	4	0	0	0	0	15
South Bend	0		0	0	2	1	0	1	0	1	15
Terre Haute	1		0	0	0	4	0	0	2	0	18
Illinois:											
Alton	0		0	0	0	5	0	0	0	1	5
Chicago	4	4	2	12	37	68	0	23	3	65	610
Elgin	0		0	1	0	0	0	0	0	0	8
Moline	0		0	0	0	1	0	0	0	4	6
Springfield	0		0	1	1	0	0	1	0	0	27
Michigan:											
Detroit	26	2	0	3	22	52	0	11	5	65	263
Flint	1		0	0	2	6	0	2	0	0	30
Grand Rapids	0		0	5	1	8	0	2	0	6	25
Wisconsin:											
Kenosha	0		0	0	1	5	0	0	0	0	9
Madison	0		0	2	0	5	0	1	0	3	16
Milwaukee	0		0	5	7	22	0	5	1	39	100
Racine	0		0	0	0	11	0	1	0	3	14
Superior	0		0	1	0	2	0	0	0	2	10
Minnesota:											
Duluth	0		0	0	3	7	0	0	0	2	18
Minneapolis	6		1	0	4	10	0	0	0	14	101
St. Paul	0		0	1	4	8	0	4	0	9	68
Iowa:											
Cedar Rapids	0			0		0	0		0	0	
Davenport	0			0		3	0		0	0	
Des Moines	0			0		4	0		0	0	36
Sioux City	0			0		8	1		0	1	
Waterloo	1			1		2	0		0	17	

City reports for week ended Oct. 24, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	1	------	1	0	10	26	0	4	1	4	98
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	12	------	0	0	6	21	0	11	6	13	211
North Dakota:											
Fargo	0	------	0	0	1	0	0	0	0	0	8
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	0	0	0	0	0	4
South Dakota:											
Aberdeen	0	------	------	0	------	9	0	------	0	0	------
Nebraska:											
Omaha	1	------	0	1	7	4	0	1	0	1	57
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	3
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	1	1	0	3	4	0	1	0	4	34
Delaware:											
Wilmington	0	------	0	8	5	0	0	0	0	1	33
Maryland:											
Baltimore	5	4	0	6	19	17	0	14	0	86	228
Cumberland	0	------	0	0	1	2	0	0	0	0	8
Frederick	0	------	0	0	0	1	0	0	0	0	5
District of Columbia: Washington	7	3	2	8	16	11	0	10	3	13	187
Virginia:											
Lynchburg	1	------	0	0	2	1	0	1	0	4	15
Richmond	1	------	1	0	4	2	0	2	0	1	55
Roanoke	7	------	0	0	0	3	0	2	0	2	22
West Virginia:											
Charleston	------	------	------	------	------	------	------	------	------	------	------
Huntington	3	------	------	0	------	8	0	1	0	0	------
Wheeling	0	------	0	1	2	5	0	0	0	0	19
North Carolina:											
Gastonia	3	------	------	0	------	1	0	------	0	0	------
Raleigh	------	------	------	------	------	------	------	------	------	------	------
Wilmington	2	------	0	0	1	2	0	0	0	0	8
Winston Salem	1	------	0	0	2	0	0	1	0	0	15
South Carolina:											
Charleston	0	------	0	0	5	3	0	0	1	0	20
Columbia	------	------	------	------	------	------	------	------	------	------	------
Florence	0	------	0	0	0	2	0	0	0	0	7
Greenville	1	------	0	2	2	0	0	1	0	0	------
Georgia:											
Atlanta	7	20	0	0	8	5	0	6	2	0	82
Brunswick	0	------	0	0	0	1	0	0	0	0	5
Savannah	3	6	0	0	1	2	0	3	0	1	28
Florida:											
Miami	0	8	0	1	2	1	0	1	0	0	28
Tampa	4	1	1	0	0	0	0	0	0	0	20
Kentucky:											
Ashland	1	------	------	0	------	4	0	3	1	0	30
Covington	0	------	0	0	3	4	0	0	0	0	12
Lexington	0	------	0	0	0	1	0	0	0	0	21
Tennessee:											
Knoxville	5	2	1	0	0	3	0	1	0	0	22
Memphis	2	------	1	0	8	8	0	1	0	8	94
Nashville	2	------	0	1	5	0	0	1	2	0	72
Alabama:											
Birmingham	3	------	0	0	5	7	0	7	0	4	89
Mobile	1	------	0	0	1	0	0	0	0	0	24
Montgomery	3	------	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	1	------	------	0	------	2	0	------	0	0	------
Little Rock	0	------	0	0	4	0	0	2	0	0	6
Louisiana:											
Lake Charles	1	0	0	0	0	0	0	0	0	0	4
New Orleans	0	17	2	0	15	9	0	11	2	0	150
Shreveport	0	------	0	0	4	0	0	0	0	0	49
Oklahoma:											
Muskogee	0	------	0	0	0	0	0	0	0	0	------
Oklahoma City	2	12	0	0	10	8	0	1	0	0	51
Tulsa	1	------	------	0	------	5	0	------	0	0	------
Texas:											
Dallas	8	------	0	0	6	6	0	2	0	5	60
Fort Worth	1	------	0	3	4	4	0	3	5	0	24
Galveston	0	------	0	0	4	0	0	0	1	0	15
Houston	8	------	1	0	9	4	0	5	1	0	82
San Antonio	2	------	0	0	12	1	0	4	0	0	60

City reports for week ended Oct. 24, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	0	------	0	0	1	0	0	0	0	0	7
Great Falls	0	------	0	1	0	0	2	0	1	5	6
Helena	0	------	0	0	0	0	0	0	0	0	4
Missoula	0	------	0	0	2	0	0	0	0	0	7
Idaho:											
Boise	0	------	0	0	0	2	0	0	0	0	9
Colorado:											
Colorado Springs	0	------	0	0	0	5	0	2	0	0	16
Denver	2	------	0	1	7	14	0	5	0	22	79
Pueblo	0	------	0	1	2	2	0	0	1	0	10
New Mexico:											
Albuquerque	0	------	0	0	0	3	0	0	0	0	6
Arizona:											
Phoenix	2	------	------	1	------	0	0	------	0	0	------
Utah:											
Salt Lake City	0	------	1	1	4	7	0	2	0	5	32
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	2	1	7	0	4	1	4	93
Spokane	0	------	0	0	6	18	0	0	0	2	32
Tacoma	0	------	0	0	3	1	0	2	0	1	24
Oregon:											
Portland	2	1	0	3	4	6	0	3	0	8	88
Salem	0	------	------	0	------	1	0	------	0	0	------
California:											
Los Angeles	16	12	0	3	20	12	0	19	1	34	324
Sacramento	1	------	0	2	1	22	0	2	0	15	21
San Francisco	3	2	1	2	7	11	0	11	0	14	154

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				District of Columbia:			
Boston	2	0	0	Washington	1	1	0
Worcester	0	0	2	Virginia:			
Connecticut:				Lynchburg	0	0	1
New Haven	0	0	1	Richmond	1	0	0
New York:				West Virginia:			
Buffalo	1	1	0	Wheeling	0	1	0
New York	5	1	2	Florida:			
Rochester	0	0	1	Miami	1	1	1
Pennsylvania:				Kentucky:			
Philadelphia	0	0	2	Ashland	1	0	0
Pittsburgh	1	0	0	Tennessee:			
Reading	1	1	0	Knoxville	0	0	1
Ohio:				Memphis	0	0	2
Cincinnati	0	0	1	Nashville	0	0	2
Cleveland	1	0	1	Arkansas:			
Toledo	0	0	4	Fort Smith	0	0	1
Indiana:				Oklahoma:			
Indianapolis	1	0	0	Oklahoma City	1	0	2
Illinois:				Tulsa	0	0	11
Chicago	1	1	15	Texas:			
Elgin	0	0	1	Houston	0	1	0
Michigan:				Colorado:			
Detroit	0	0	4	Denver	2	1	0
Wisconsin:				Utah:			
Milwaukee	0	0	1	Salt Lake City	1	0	0
Minnesota:				Washington:			
Minneapolis	1	0	0	Seattle	0	0	1
Missouri:				Spokane	0	0	1
St. Louis	0	1	8	Oregon:			
Nebraska:				Portland	1	0	0
Omaha	1	0	0	California:			
				Los Angeles	1	1	3

Epidemic encephalitis.—Cases: New York, 1; Kansas City, 2; Baltimore, 1.

Pellagra.—Cases: Wilmington, N. C., 2; Atlanta, 2; Savannah, 4; Birmingham, 1; New Orleans, 1; Sacramento, 1.

Typhus fever.—Cases: Charleston, S. C., 6; Atlanta, 2; Savannah, 2; Montgomery, 1.

FOREIGN AND INSULAR

CANADA

Manitoba—Poliomyelitis.—During the week ended October 24, 1936, 19 cases of poliomyelitis were reported in the Province of Manitoba, Canada. During the same week 4 cases of poliomyelitis were reported in Winnipeg.

Provinces—Communicable diseases—2 weeks ended October 17, 1936.—During the 2 weeks ended October 17, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					2	1				3
Chicken pox		1	1	169	318	80	99	28	162	858
Diphtheria		5	1	45	15	3	4	2	1	76
Dysentery				1	4					5
Erysipelas				10	8	5	3	2	7	35
Influenza		2			24					26
Measles				115	650	67	195	67	130	1,224
Mumps			10		139	14	14	11	57	245
Paratyphoid fever					2					2
Pneumonia	3	2			25				9	39
Poliomyelitis				15	38	91	17	3	5	169
Scarlet fever		4	8	149	195	106	42	183	60	747
Trachoma							1			1
Tuberculosis	6	17	13	77	60	8	30	4	20	235
Typhoid fever	1		8	36	23	4	21	4	4	101
Undulant fever				1	4				1	6
Whooping cough	1	2		127	237	10	17	23	34	451

CUBA

Habana—Communicable diseases—4 weeks ended October 24, 1936.—During the 4 weeks ended October 24, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	12		Poliomyelitis	[1] 6	
Dysentery (bacillary)	2		Tuberculosis	14	6
Leprosy	1		Typhoid fever	[1] 55	15
Malaria	[1] 134	1			

[1] Includes imported cases.

ITALY

Communicable diseases—4 weeks ended September 13, 1936.—During the 4 weeks ended September 13, 1936, cases of certain communicable diseases were reported in Italy as follows:

Disease	Aug. 17-23		Aug. 24-30		Aug. 31-Sept. 6		Sept. 7-13	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	54	45	40	33	36	32	39	26
Cerebrospinal meningitis	8	6	7	6	12	12	9	8
Chicken pox	85	59	71	51	77	53	57	37
Diphtheria and croup	458	232	440	237	439	237	523	264
Dysentery	41	19	47	21	32	19	31	26
Hookworm disease	12	7	20	9	10	6	18	11
Lethargic encephalitis	8	6	4	3	1	1	1	1
Measles	422	136	367	129	329	119	328	111
Mumps	103	63	126	71	90	59	57	38
Paratyphoid fever	177	112	136	104	158	93	147	99
Poliomyelitis	74	59	59	48	61	48	69	53
Puerperal fever	29	26	27	27	24	23	23	23
Scarlet fever	225	122	213	114	227	115	232	116
Typhoid fever	1,057	529	837	441	913	495	892	479
Undulant fever	54	39	36	29	47	35	34	29
Whooping cough	383	146	398	146	346	127	323	122

PANAMA CANAL ZONE

Communicable diseases—July–September 1936.—During the months of July, August, and September 1936, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	July		August		September	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chicken pox	6		3			
Diphtheria	6		18		27	
Dysentery (amoebic)	34	1	19	1	12	1
Dysentery (bacillary)	2	2		2	9	1
Leprosy	1					
Malaria	218	2	133	4	91	8
Measles	5	1	2		15	
Mumps	2				3	
Paratyphoid fever			1			
Pneumonia		27		10		19
Relapsing fever			1			
Tuberculosis		25		24		26
Typhoid fever	3		2	1		
Whooping cough	6		10		6	

YUGOSLAVIA

Communicable diseases—September 1936.—During the month of September 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	100	13	Poliomyelitis	10	
Cerebrospinal meningitis	4	1	Scarlet fever	644	13
Diphtheria and croup	1,071	92	Sepsis	9	3
Dysentery	270	34	Tetanus	48	15
Erysipelas	261	14	Typhoid fever	1,288	91
Measles	181		Typhus fever	6	1
Paratyphoid fever	63	7			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE —A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for October 30, 1936, pages 1518–1531 A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued November 27, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month

Plague

Ecuador.—During the period October 7–25, 1936, 2 cases of plague with 1 death were reported at Guayaquil, and 3 cases at Bajada del Morro, in the vicinity of Guayaquil, Ecuador.

Hawaii Territory.—Plague infection has been proved in rats in Hawaii Territory as follows: On the island of Hawaii—Hamakua District: In Hamakua Mill sector, 1 rat found October 29, 1936; in Paauhau sector, 1 rat found October 30 and 1 rat found November 2. On the island of Maui, 1 rat found October 20 in Keahau region, Wailuku district.

Smallpox

Mexico.—During the month of August 1936 smallpox has been reported in Mexico as follows: Chihuahua, Chihuahua State, 1 case: Guadalajara, Jalisco State, 3 cases, 1 death; Mexico, D. F., 5 cases, 3 deaths.

Typhus Fever

Irish Free State—Kerry County—Dingle.—A report dated October 12, 1936, states that 2 cases of typhus fever had been reported in Dingle, Kerry County, Irish Free State.

Mexico.—During the month of August 1936, typhus fever was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 8 cases, 1 death; Guadalajara, Jalisco State, 1 case; Durango State, 1 death; Guanajuato State, 7 cases, 3 deaths; Mexico State, 10 cases, 2 deaths; Mexico, D. F., 19 cases, 8 deaths; Oaxaca State, 4 cases; Puebla, Puebla State, 10 cases, 2 deaths; Queretaro State, 1 case; San Luis Potosi, San Luis Potosi State, 4 cases.

Yellow Fever

Senegal—Khombole.—On October 26, 1936, 1 case of yellow fever was reported in Khombole, Senegal.

Sierra Leone—Daru.—On October 14, 1936, 1 suspected case of yellow fever was reported at Daru, Sierra Leone.

X

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law. United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

CONTENTS

Poliomyelitis cases reported in each State[1] during recent weeks of 1936

Division and State	45 weeks ended—				Cases reported in 1936 for week ended—									
	Nov. 11, 1933	Nov. 10, 1934	Nov. 9, 1935	Nov. 7, 1936	Sept. 5	Sept. 12	Sept. 19	Sept. 26	Oct. 3	Oct. 10	Oct. 17	Oct. 24	Oct. 31	Nov. 7
All States[2]	4,593	6,869	10,151	3,014	182	218	242	277	290	261	246	197	195	165
New England:														
Maine	59	18	140	38	1	4	1	6	0	0	1	0	2	0
New Hampshire	7	8	54	4	0	0	0	0	0	0	1	0	0	0
Vermont	33	8	41	9	0	0	0	0	0	0	0	0	0	0
Massachusetts	353	74	1,376	59	0	4	1	1	1	2	2	4	3	0
Rhode Island	17	1	326	2	0	0	0	0	0	0	0	0	0	0
Connecticut	72	14	391	15	1	0	0	3	0	1	1	2	0	0
Middle Atlantic:														
New York	1,338	219	2,792	207	20	11	12	16	6	9	14	10	6	6
New Jersey	239	64	487	28	1	1	1	2	1	2	0	1	0	1
Pennsylvania	374	125	196	116	5	7	8	1	11	7	8	4	9	7
East North Central:														
Ohio	342	258	95	280	2	18	17	27	40	24	45	24	22	9
Indiana	40	57	42	51	1	2	3	7	3	10	3	2	4	3
Illinois	209	207	231	645	30	52	48	75	70	95	53	45	39	25
Michigan	89	210	600	141	5	2	11	9	15	18	11	15	13	4
Wisconsin	54	127	59	42	1	4	4	4	6	7	3	0	3	1
West North Central:														
Minnesota	308	84	62	26	0	1	3	3	3	2	2	1	0	1
Iowa	42	32	54	67	3	7	4	7	9	5	7	4	6	3
Missouri	35	32	36	54	2	5	4	2	0	5	8	3	2	5
North Dakota	84	11	16	18	0	0	2	2	2	0	4	1	1	0
South Dakota	31	36	10	11	2	0	0	1	2	1	0	0	0	1
Nebraska	17	16	13	20	1	3	0	3	2	0	1	2	0	1
Kansas	49	72	31	71	0	5	3	4	10	6	1	8	8	6
South Atlantic:														
Delaware	14	3	5	1	0	0	0	0	0	0	0	0	0	0
Maryland	42	22	97	31	1	1	7	5	1	2	3	1	2	1
District of Columbia	6	8	54	7	0	0	0	1	3	0	0	0	0	0
Virginia	37	73	676	53	4	2	5	3	3	0	1	1	2	2
West Virginia	87	81	40	58	3	4	7	4	7	1	3	7	2	6
North Carolina	25	41	648	45	1	3	1	1	0	0	2	2	1	1
South Carolina	21	13	30	13	0	0	0	0	0	0	5	2	0	0
Georgia	8	20	19	112	5	12	9	11	8	7	9	7	5	4
Florida	8	15	16	34	2	0	1	0	9	1	3	1	1	2
East South Central:														
Kentucky	40	114	305	72	4	1	1	1	3	4	4	9	2	1
Tennessee	107	59	75	350	22	21	17	23	24	15	8	14	23	2
Alabama	24	47	53	407	5	15	13	6	6	1	5	1	10	2
Mississippi	8	20	13	121	18	5	6	3	4	4	4	2	2	3

West North Central:														
Arkansas	11	13	25	34	1	0	1	1	0	1	9	4	4	8
Louisiana	22	17	98	23	3	1	2	1	1	1	1	0	0	0
Oklahoma	22	11	11	50	0	1	1	0	2	0	0	2	6	31
Texas	40	137	76	46	1	5	1	5	2	1	1	4	6	2
Mountain:														
Montana	7	315	6	15	1	1	0	1	1	0	0	0	0	0
Idaho	2	121	1	16	0	2	1	0	0	0	3	0	0	0
Wyoming	11	8	2	6	0	1	2	0	2	0	0	0	0	0
Colorado	6	16	9	56	2	4	8	9	8	1	1	0	1	10
New Mexico	6	16	6	24	2	0	4	4	1	2	2	1	3	0
Arizona	11	106	17	6	0	0	2	0	0	0	0	0	0	1
Utah	10	13	9	3	0	1	0	0	1	0	0	0	0	0
Pacific:														
Washington	76	697	36	63	7	2	10	5	4	4	0	3	1	2
Oregon	28	74	22	36	0	2	2	5	2	2	4	2	2	3
California	122	3,136	722	318	25	13	15	18	18	10	13		4	11

[1] A similar table appeared in the Public Health Reports for October 23, 1936, p. 1456.
[2] Nevada excluded; no data

Smallpox.—The number of cases of smallpox reported for the current period was 204. Montana reported 68, North Dakota 29, Iowa 20, and South Dakota 12; more than one-half of the total cases were in those 4 States. During this period in 1935, 1934, and 1933 the cases for the entire reporting area totaled 244, 350, and 211, respectively. Only 2 cases were reported from States along the Atlantic Coast, and 6 from the South Central regions.

Influenza.—During the current 4-week period the number of cases of influenza totaled 2,659, approximately 1,400 more than were reported for the preceding 4-week period. An increase of this disease is expected at this season of the year, but so far there is nothing to indicate other than a normal rise. The current incidence stood at approximately the average level of the 3 preceding years. Among the various geographic regions the West North Central, South Central, and Mountain and Pacific showed slight increases over the figures for this period in 1935; the East North Central and South Atlantic showed decreases; while the North Atlantic regions reported approximately the same incidence as in 1935.

Diphtheria.—The usual seasonal increase of diphtheria continued. For the 4 weeks under consideration 3,507 cases were reported. Compared with recent years the current incidence was about 65 percent of that for the corresponding period in 1935 and 1934 and only about 40 percent of the average incidence for the 5 preceding years. In the South Atlantic region the incidence approached the level of last year very closely, but in all other regions the disease was considerably less prevalent, decreases from the figures for last year ranging from about 30 percent in the Mountain and Pacific regions to about 70 percent in the West North Central region.

Measles.—The expected seasonal increase of measles was apparent in all sections of the country. In relation to preceding "normal measles" years the number of cases (2,022) was low, being less than 50 percent of the average incidence for the years 1929–33, inclusive. The current low incidence follows a period of unusual prevalence of this disease in all sections of the country during the years 1934 and 1935; each geographic region is now reporting the lowest incidence in recent years.

Typhoid fever.—For the 4 weeks ended October 31 there were 1,768 cases of typhoid fever reported as compared with 1,600, 1,959, and 2,326 for the corresponding period in the years 1935, 1934, and 1933, respectively. Among the various geographic regions, those along the Atlantic coast showed rather significant increases over last year, the Mountain and Pacific regions reported a 15 percent decrease, while in the North and South Central regions the incidence was about on a level with that of last year.

Mortality, all causes.—The average mortality rate from all causes for large cities for the 4 weeks ended October 31 as reported by the Bureau of the Census was 11.8 per 1,000 inhabitants (annual basis). The rates for the separate weeks were 11.1, 10.9, 11.3 and 11.1, respectively. For the corresponding 4-week period in 1935, 1934, and 1933 the rates were 10.8, 10.6, and 10.6, respectively. An examination of the data for a group of large cities shows that during this period the death rate in some cities, located mostly in the northern half of the country, was more than twice the rate for the corresponding period last year. Among the communicable diseases, however, there was apparently little contribution to the rise; influenza and pneumonia, which are quite often responsible for a rise in the death rate at this time, showed no increase other than the normal expectancy.

AUDIOMETRIC STUDIES ON SCHOOL CHILDREN

II. Types of Audiometric Curves[1]

By Antonio Ciocco, *Assistant Statistician, United States Public Health Service*

This paper presents data on the hearing of almost 1,400 selected children who were tested with a Western Electric Co. 2–A audiometer. A description is given of the audiometric curves and of their characteristics in relation to differences in age, sex, condition of tympanic membrane, nose and tonsils, frequency of upper respiratory infections, and history of otitis media.

MATERIAL AND METHOD

The material used here is part of that collected since 1931 by the Office of Child Hygiene, of the Public Health Service, in a survey of Washington (D. C.) school children. A more complete discussion of the investigation is given in the first paper of this series (*7*).

The subjects whose hearing records constitute this material comprise (*a*) about 700 children who, when tested previously with a 4–A audiometer, showed a hearing loss of 9 or more S. U. (sensation units), and (*b*) an approximately equal number of children of the same age, sex, and school grade whose 4–A tests showed a hearing loss not greater than 6 S. U.

According to this method of selection, the records obtained cannot be considered as furnishing a completely representative sample of the hearing of children in the general population, and it might be expected that the two groups of children would be unequivocally differentiated relative to their hearing. Actually this is not so, owing to the lack of

[1] From the Office of Child Hygiene Investigations, U. S. Public Health Service. The author wishes to acknowledge the valuable assistance of B. L. Jarman, M. D., who made the audiometric and clinical examinations.

precision of tests made with the 4–A audiometer. Among the children examined, 71 percent of those with a hearing loss of 9 S. U., or more, have good hearing (type I audiogram; see fig. 1); among the children with less than 6 S. U. hearing loss, 5 percent have some hearing impairment, one child being almost totally deaf in one ear. It is worthy of note that, in answer to a questionnaire, 78 children with impaired hearing attributed their condition to some specific cause—trauma in 2 instances, childhood diseases (measles, mumps, diphtheria, scarlet fever) in 38 cases, and chronic discharging ears in 38 cases.

The initial step in the analysis of the data was the classification of the audiograms of hearing by air conduction into the following groups:[2]

Group I: Good hearing for all tones. All tones are heard at an intensity equal to or less than 20 db. (decibels).

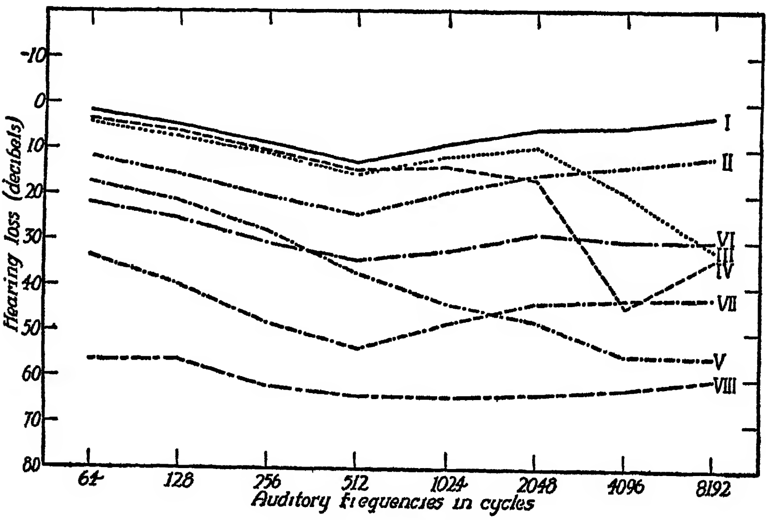

FIGURE 1.—Average thresholds of audiograms falling in specified groups

Group II: Slight loss for auditory frequencies of the middle range (256 to 1,024 cycles.) These tones are heard at an intensity between 25 and 35 db. All other tones are heard as in I.

Group III: Slight loss for high tones. Tones of 2,048, 4,096, and 8,192 cycles are heard between 20 and 30 db. All other tones heard as in I.

Group IV: Marked high tone loss of the abrupt type. Tones of 2,048, 4,096, and 8,192 cycles heard only at an intensity greater than 30 db. All other tones heard as in I.

Group V: Marked high tone loss with involvement of low and middle tones. The curves slope downwards from left to right and

[2] This is a slight modification of the method of classification described by the author in references (4), (5), and (6).

correspond to the high tone loss of the "gradual" type discussed by Crowe et al. (*8*). All tones except those of 64 and 128 cycles are heard only at an intensity greater than 20 db. The impairment for high tones is greater than that for middle tones.

Group VI: Moderate loss for all tones. Thresholds are between 25 and 45 db.

Group VII: Marked loss for all tones. Thresholds are between 45 and 65 db.

Group VIII: Extreme loss for all tones. No tone is heard at an intensity less than 55 db. Here are included cases in which the child did not respond to any tone, even at the maximum intensity of the audiometer.

For purposes of illustration, in figure 1 is presented the mean or average curve [3] for each of the 8 types of audiograms. These average curves were obtained by calculating, for the audiograms that fell into a given group, the mean threshold for each tone. Certain general characteristics of the different types of audiograms may be visualized with the aid of this figure. Thus, groups I, II, VI, VII, and VIII, in the order mentioned, represent a reasonably regular sequence in which hearing is increasingly diminished equally for all tones; groups III and IV represent cases with normal hearing except for the diminution of acuity for high tones; group V represents cases in which the lowest tones are heard at approximately normal intensities, but as the pitch is raised the hearing acuity is decreased.

The next step in this analysis was to classify the cases of hearing impairment according to the two fundamental types of aural lesions. As usual, the relationship between the air and bone conduction acuity served to differentiate between conductive deafness and so-called nerve deafness. In this material, a bone conduction receiver was employed in the place of tuning forks, but at the time no attempt was made to use some "masking" device in order to exclude the participation of one ear while testing the other. This is a rather serious omission, since no Weber test was made.[4] For the purposes of the study, the bone conduction threshold for 512 cycles was used as a measure of bone conduction acuity and the children in the following groups were classified as having a conductive type of hearing impairment.

1. Children with bilateral hearing impairment by air conduction and for whom the threshold of bone conduction acuity lies within the range marked out by two standard deviations above and below the

[3] The means for group VIII are not precise, because when a tone was not perceived at the maximum intensity of this audiometer, the threshold was assumed.

[4] It cannot be emphasized too strongly that "masking" of one ear while testing the other is an essential procedure if the results of hearing tests are to have any diagnostic or scientific value. This has been particularly stressed by the Committee on Methods of Testing Hearing by Bone Conduction of the American Otological Society at the meeting held in Detroit in May 1936.

mean threshold found for children with good hearing.[5] There are 15 children in this group.

2. Children with a unilateral hearing impairment by air conduction and whose bone conduction acuity for the poorer hearing ear has a threshold inferior in arithmetic value equal to, or no more than, 10 db. higher than that of the better ear. There are 79 such children, 39 with a conductive lesion in the right ear and 40 with a conductive lesion in the left ear.

All other cases in which the air conduction is impaired have been considered as having a nerve type of deafness.

TYPES OF AUDIOGRAMS

The absolute and percentage distributions of the audiograms, grouped as described in the foregoing section, are shown in table 1 All the types of audiometric curves are represented. Of course the majority of cases fall in group I (good hearing); but it is interesting to note the presence of many "high tone loss" cases (groups III, IV, and V), the pathology of which has been definitely established by Crowe, Guild, and Polvogt (*8*). These authors have demonstrated that degeneration of the nerve and end-organ in the basal turn of the cochlea usually accompanies high tone loss of the abrupt type (for example, group IV). In such cases the degree and extent of damage to the nerve and end-organ are related roughly to the amount of hearing loss and to the tones involved. On the other hand, high tone loss of the gradual type[6] (group V of this classification) is characterized by degeneration of the nerve *alone* at different levels of the basal turn of the cochlea.

TABLE 1.—*Distribution of audiograms of Washington (D. C.) school children*

Audiogram group	Frequency		Audiogram group	Frequency	
	Number	Percent		Number	Percent
I	2,345	85.52	VI	61	2.23
II	82	2.99	VII	25	.91
III	82	2.09	VIII	29	1.06
IV	79	2.85			
V	39	1.42	Total	2,742	100.00

In the study of the relationship between hearing acuity and individual characteristics (age, heredity, sex, etc.) or systemic diseases, the hearing of the poorer ear is taken as a measure of the subject's auditory condition. In table 2 is given the distribution of the children according to the hearing of the poorer ear and the relation of the bone

[5] The mean is 59.81±0.06 db., and the standard deviation is equal to 3.84±0.039 db.

[6] The Rinne test being positive, that is, air conduction is better than bone conduction.

Table 2.—*Distribution of children according to the type of audiogram of the poorer hearing ear*

Audiogram group	Bone conduction proportionally reduced (AC>BC)		Bone conduction not reduced (conductive deafness)		Total	
	Number of children	Percent of grand total	Number of children	Percent of grand total	Number of children	Percent
I	1,083	78.99			1,083	78.99
II	53	3.86			53	3.86
III	52	3.80			52	3.80
IV	54	3.94			54	3.94
V	11	.80	18	1.31	29	2.11
VI	9	.65	39	2.85	48	3.50
VII	4	.30	19	1.38	23	1.68
VIII	11	.80	18	1.32	29	2.12
Total	1,277	93.14	94	6.86	1,371	100.00

conduction to the air conduction in that ear. The following facts may be deduced from this and the preceding table:

1. The audiograms of children fall into the same characteristic groups as those observed in adults.

2. The types of audiogram usually considered a characteristic of advancing age (groups III and IV) are also found in children. Of all the audiograms that fall in these two groups, over 25 percent show the so-called 4,096 "dip." Evidence presented elsewhere by the author (*4*) indicates that this particular "dip" is a first sign of the degenerative process which results in the loss of acuity for all high tones.

3. With the exception of the children included in groups I, II, and VI, the remaining have the types of hearing impairment which have been shown to accompany definite pathologic changes in the middle ear, inner ear, or both.

4. A conductive lesion is responsible for about two-thirds of the cases with moderate or marked impairment for tones of the middle and low range. There are 129 children whose audiograms fall in groups V, VI, VII, and VIII, and 94 of these have a conductive type of deafness.

In order to judge the significance of these data, they may be compared with those obtained from hospitalized youths, less than 20 years old, examined in the Otological Research Laboratory of the Johns Hopkins University (*4*). This comparison (table 3) shows that the incidence of children with good hearing (group I) is higher in the present material while the relative number of children with a slight high tone loss (group III) is lower; otherwise the two distributions are closely alike. Especially is this true for the incidence of marked hearing impairment. The differences are very probably due to the fact that the hospitalized children are slightly older; and, as will be shown, this is a matter of some importance with regard to the incidence of high tone loss. Therefore, notwithstanding the method

of selection of the material, it is possible to generalize to some extent regarding the relative frequency of the different forms of impairment.

TABLE 3.—*Comparative distributions of audiograms of the poorer hearing ear of Washington (D. C.) school children and of unselected hospital patients less than 20 years of age*

Audiogram group	Percent of children with specified audiograms	
	School children	Hospital patients [1]
I	78.99	69.35
III	3.80	13.14
IV	3.94	2.92
V (AC>BC)	.80	
II, VI, VII (AC>BC)	4.81	8.76
V, VI, VII (BC>AC)	5.54	3.64
VIII	2.12	2.19
Total	100.00	100.00
Number of children	1,371	147

[1] Tested at the Otological Research Laboratory of the Johns Hopkins University. *Cf.* Ciocco (4).

AGE AND SEX

The distribution of these children according to age and according to the hearing of the poorer ear is shown in table 4. Since the number of cases in most of the hearing groups is small, the following combinations have been made (*a*) "Good hearing", to include only group I; (*b*) "high tone loss", to include groups III and IV; (*c*) "impairment for conversation",[7] to include the remaining groups. From table 4 the following facts may be noted:

TABLE 4.—*Age and hearing*

Age (in years)	Hearing of poorer ear					Number of children
	Good	High tone loss	Impairment for conversation		Total	
			Bone conduction reduced (AC>BC)	Bone conduction good (conductive deafness)		
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	
7–9	88.34	3.40	5.83	2.43	100.0	206
10–11	83.54	5.57	6.33	4.56	100.0	395
12–13	77.37	9.50	5.86	7.27	100.0	358
14–15	73.45	9.30	6.19	11.06	100.0	226
16 and over	68.81	11.83	8.60	10.76	100.0	186

1. The percentage of children with good hearing decreases as age advances.

2. The incidence of high tone loss increases with advancing age.

[7] It is understood that some of the children with high tone loss will also have difficulty in understanding speech.

3. Children with impairment for conversation, whether associated with a conductive or nonconductive type of lesion, are more frequent in the older age groups than in the younger ones. This is to be expected, because the probability of infection is dependent upon the length of exposure to risk.

The decrease in the perception of high tones, presbyacusia, is a well-known phenomenon which accompanies increasing age. However, not until instruments were constructed to measure hearing acuity was its onset and mode of progression described. Zwaardemaker (*13*), in 1891, found, with the Galton whistle, that the upper limit of auditory perception was lowered with increasing age. The same was shown in 1913 by Struycken (*11*), who used his monochord. Bunch (*1*), in 1929, was the first to demonstrate this type of hearing impairment when the subjects were tested with an audiometer. He found that, together with the lowering of the upper auditory limit, this phenomenon is accompanied by a decreased perception for the tones of 4,096 cycles and higher. In 1932, Ciocco (*4*) presented evidence to indicate that, as age increases, the audiometric curve first shows a 4,096 "dip" and then becomes similar to the curve represented by Group IV in figure 1. While the pathology of this type of hearing loss is fairly well known (*8*), its etiology remains a problem to be solved. From the results shown in table 4, one must conclude that, contrary to general assumption, the pathologic process which causes this type of impairment can originate early in life.

Subdivision of the data by sex shows there are records for 704 boys and for 667 girls. The absolute and percentage distributions of the audiograms of the poorer ears for the two sexes are shown in table 5. This table shows that the only statistically significant difference between the boys and girls lies in the incidence of marked high tone loss, group IV, in which there are five times as many boys as girls.[8] The greater frequency of high tone loss in males when compared to females is a characteristic first observed in adults by Bunch and Raiford (*3*) and confirmed by Ciocco (*4*). Its physiologic or pathologic significance has not yet been discovered. The hypothesis has been advanced that this difference is a consequence of the fact that men are more likely to encounter injurious noises in their occupations, while women, in general, lead a more sheltered life. The findings here reported seem to contradict this assumption, since the environment of the boys and girls is probably very much the same.

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[8] The percentage of boys with a group IV type of audiogram is 6.90±0.99, that of girls is equal to 1.44±0.48. The difference is 4.98 times its probable error

TABLE 5.—*Hearing of poorer ear in boys and girls*

Audiogram group	Bone conduction proportionally reduced (AC>BC)				Bone conduction good (conductive deafness)			
	Boys		Girls		Boys		Girls	
	Number of children	Percent	Number of children	Percent	Number of children	Percent	Number of children	Percent
I	534	81.90	549	87.84				
II	22	3.37	31	4.96				
III	33	5.06	19	3.04				
IV	45	6.90	9	1.44				
V	6	.92	5	.80	11	21.15	7	16.66
VI	3	.46	6	.96	23	44.23	16	38.10
VII	3	.46	1	.16	8	15.38	11	26.19
VIII	6	.93	5	.80	10	19.24	8	19.05
Total	652	100.00	625	100.00	52	100.00	42	100.00

In this material the average age of the males, 12.38±0.07 years, is higher than that of the females, 11.99±0.07 years. In order to test whether the difference in the incidence of high tone loss found in the two sexes is due to the difference in ages, these must be equalized. If the boys had the same age distribution as the girls, on the basis of the percentages shown in table 5, the following distribution would be expected:

	Boys (expected)	Girls (actual)
Good hearing	516.33	549
High tone loss	70.93	28
Impairment for speech	37.74	48
Total	625.00	625

These distributions differ in the same sense as those of table 5; a chi-square equal to 30.82 shows that the differences are statistically significant. Most of the chi-square value is due to the different incidence of cases with marked high tone loss. It is evident, therefore, that the difference in the incidence of high tone loss as found in the two sexes is independent of age. Moreover, the higher incidence of high tone loss in boys is true for each age group. This appears to indicate that, whatever is the cause of the sex difference in the loss of perception for high tones, it is not associated with the onset of puberty.

The fact that the influence of age and sex on the incidence of high tone loss is evident even in children, appears to be of the greatest importance. In the first place, it means that, in order to discover the etiology of high tone loss, all investigations should begin with the study of hearing in childhood. In the second place, it is clear that the different incidence of high tone loss in males and females, which is also manifested in the youngest children, should be regarded as a

true secondary characteristic of differentiation between the sexes. As a consequence, it may be concluded that the susceptibility to loss of high tones is intimately associated with the constitutional make-up of the individual. This may explain, also, why attempts to correlate various disease conditions with high tone loss have been fruitless, and indicates, furthermore, that future investigation on this problem should be directed toward a more adequate study of the individual constitution.

CONDITION OF TYMPANIC MEMBRANE AND HISTORY OF OTITIS MEDIA

The condition of the tympanic membrane, as given in the records, was classified in the following manner: (1) Normal; (2) slight changes, including slight or moderate retraction and (or) thickening; (3) marked changes, including marked retraction or thickening, calcification, scarring; (4) perforations. In table 6 the percentage distributions are given for the different conditions of the tympanic membrane for the ears that fall in several hearing groups. The incidence for marked changes and perforations combined is less for those ears with good hearing than for those with high-tone loss or with impaired hearing for conversation and reduced bone conduction acuity. The higher incidence of high-tone loss cases, when compared with ears with good hearing, is very interesting and raises again the question of what part middle-ear infections play in loss of perception for high tones. It may be recalled that Politzer (*10*), Wanner (*12*), and Struycken (*11*), have at various times expressed their opinion that middle-ear infections do affect the perception for high tones. Bunch and Grove's (*2*) findings lend themselves to this interpretation, and certain cases cited by Ciocco (*4*) also seem to indicate a causal relationship between decreased acuity for high tones and middle-ear infection.

TABLE 6.—*Tympanic membrane and hearing*

Appearance of tympanic membrane	Hearing of poorer ear			
	Good	High tone loss	Impairment for conversation: Bone conduction reduced (AC>BC)	Impairment for conversation: Bone conduction good (conductive deafness)
	Percent	*Percent*	*Percent*	*Percent*
Normal	9 96	8 86	1 62	3 84
Slight changes	85 63	78.48	78 87	51 92
Marked changes	3 85	6 96	13 82	11 54
Perforations	.56	5 70	5 69	32 70
Total	100 00	100.00	100.00	100 00
Number of ears	2,339	158	123	104

As expected, the incidence of marked changes and perforations of the tympanic membrane is markedly higher in the ears with a conductive type of lesion. The incidence in these is about 10 times as high as in those with good hearing, 44.24 percent and 4.41 percent, respectively. When one recalls that an otoscopic examination does not always reveal signs of past infections of the middle ear, the high incidence of marked changes and perforations found in the children with a conductive type of hearing impairment clearly manifests the importance of discharging ears as a factor in producing hearing impairment in children. This is also evident from the statements regarding history of earache and discharge. Of the children with good hearing, 19.3 percent have had earaches and 14 percent have had discharging ears. The children with high-tone loss and with impairment for conversation and reduced bone conduction acuity give only a slightly higher incidence—21.5 percent and 25.2 percent, respectively—have had earaches, and 20.1 percent and 22 percent, respectively, have had discharging ears. Of the children with conductive deafness, 18.1 percent have had earache and 54.3 percent have had discharging ears.

The relationship between the appearance of the tympanic membrane and hearing acuity may also be studied from another viewpoint. From table 6 it is seen that audiograms representative of good hearing are found for ears showing marked changes and perforations of the tympanic membrane. It can be safely presumed that in these ears the ossicular mechanism and the cochlea are intact. Therefore, by limiting the analysis to these cases it can be determined whether or not the auditory acuity is affected by pathologic changes of the tympanic membrane alone or accompanied by only minor middle-ear lesions. In table 7 are given the average thresholds of air-conduction acuity for cases of good hearing in relation to the appearance of the tympanic membrane. The air-conduction acuity is best for those ears with normal tympanic membranes; it is worse for the ears showing marked changes and perforations. For each auditory frequency the difference in mean thresholds between the ears with normal tympanic membranes and those with slight changes is generally less than the difference between the latter and the ears with marked changes and perforations. The differences are fairly constant for all tones and all are statistically significant.

TABLE 7.—*Mean threshold (in decibels) of conduction acuity in relation to condition of tympanic membrane (children with good hearing)*

Condition of tympanic membrane	Auditory frequencies (in cycles)							
	64	128	256	512	1,024	2,048	4,096	8,192
Normal	0.74±0.08	4.05±0.07	8.17±0.08	12.41±0.06	8.66±0.07	4.70±0.08	3.57±0.09	1.20±0.11
Slight changes	1.84± .03	4.86± .03	9.06± .03	13.18± .02	9.38± .03	5.82± .03	5.20± .03	3.01± .04
Marked changes and perforations	2.91± .12	6.16± .11	10.41± .11	14.36± .11	10.17± .13	6.69± .12	7.09± .17	5.23± .18

Those results point to the conclusion that changes in the appearance of the tympanic membrane, whether or not they coexist with minor lesions of the middle ear, do affect the hearing acuity sufficiently to be detected.

CONDITIONS OF NOSE AND THROAT AND HISTORY OF UPPER RESPIRATORY INFECTIONS

Nothing remarkable is observed regarding the relationship between the condition of the nose, as described by the physician, and the hearing of these children. A deflection of the septum is found in more than 50 percent of the children. This ratio does not vary significantly in the different hearing groups, although it is slightly lower in the children with good hearing. About 30 percent of the children with good hearing have nasal passages that appear normal on inspection. This is found slightly less often (in 24 percent of the cases) in the other children.

The condition of the tonsils found at the time of the examination is reported in table 8. The incidence of removed tonsils is higher in children with hearing impaired for conversation than for the children whose audiograms fall in the other two hearing groups. The explanation of this is simple when it is recalled that the removal of tonsils, as a focus of infection, is usually one of the first steps taken in the treatment of auditory disorders. In those cases in which the tonsils were still present, the proportion of children with normal and diseased tonsils is practically the same for each hearing group.

TABLE 8.—*Hearing and condition of tonsils*

Condition of tonsils	Hearing of poorer ear			
	Good	High tone loss	Impairment for conversation	
			Bone conduction reduced (AC>BC)	Bone conduction good (conductive deafness)
	Percent	*Percent*	*Percent*	*Percent*
Removed	54 80	59 43	61 36	70 21
Normal	32 07	27 36	22 73	20 21
Diseased	13 13	13 21	15 91	9 58
Total	100 00	100 00	100 00	100 00
Number of children	1,082	106	88	94

A history of frequent upper respiratory infections was elicited from 411 of the 1,246 children, that is, 33 percent of the children who replied to the question. Of the children with good hearing, 34 percent complained of such disturbance; of the children with high-tone loss, 28 percent; and 47 percent of those with hearing impairment for

conversation and reduced bone-conduction acuity. These differences are not, however, statistically significant.

From these facts it appears that there exists no relationship between type and degree of hearing impairment and conditions of nose and tonsils, as observed at the time of the examination, or from past history of frequent upper respiratory infection.

SUMMARY

Statistical analyses of the hearing records of about 1,400 Washington (D. C.) school children, tested with a Western Electric Co. 2-A audiometer, reveal the following facts:

1. The audiometric curves of children may assume any of the characteristics found in adults.

2. A conductive lesion is responsible for about two-thirds of the cases with moderate or marked hearing impairment which involves tones of the middle and low ranges.

3. The incidence of high-tone loss increases regularly with advancing age and is greater in boys than in girls.

4. Normal tympanic membranes and those with slight changes are found in 96 percent of the ears which have good hearing, in 87 percent of those with high-tone loss, in 80 percent of those with hearing impairment for conversation and reduced bone-conduction acuity, and in only 56 percent of the ears with conduction deafness. In ears with good hearing, the air-conduction acuity is best in those cases with normal tympanic membranes and worse when the tympanic membrane shows marked changes or perforations.

5. Apparently there exists no relationship between type and degree of hearing impairment and condition of nose and tonsils as observed at the time of the examination.

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COURT DECISION ON PUBLIC HEALTH

State regulations for the control of bovine tuberculosis held invalid.—(South Dakota Supreme Court; *Anderson* v. *Russell*, State Secretary of Agriculture, *et al.*, 268 N. W. 386; decided June 24, 1936.) The regulations promulgated by the Secretary of Agriculture of the State of South Dakota for the eradication of bovine tuberculosis provided that all cattle, with a few exceptions, should be subjected to an official tuberculin test before entering certain quarantined areas, that it should be the duty of the department of agriculture to quarantine all farms or places where the owners refused to submit their cattle to the tuberculin test, and that the owners who failed to submit their cattle to the tuberculin test would be guilty of a misdemeanor. The plaintiff, whose herd of cattle had been examined and found free from tuberculosis by a private veterinarian not in the employ of the State, brought an action to restrain the State officials from quarantining his herd of cattle and forcing him to submit such cattle to a tuberculin test by the State agent. The trial court enjoined the State officials from quarantining the plaintiff's cattle until it was determined that said cattle were infected with tuberculosis, and from subjecting the cattle to the tuberculin test without the plaintiff's consent. On appeal this order was affirmed for the following reasons:

1. That the laws of South Dakota merely conferred upon the secretary of agriculture the power and right to make investigations and quarantine and control in event of the established existence of communicable disease as a fact.

2. That the legislature had not delegated the compulsory power to the secretary of agriculture and that if there had been an attempt to delegate such power it would have failed as an improper delegation.

DEATHS DURING WEEK ENDED OCT. 31, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 31, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	7,938	7,842
Deaths per 1,000 population, annual basis	11.1	10.9
Deaths under 1 year of age	521	509
Deaths under 1 year of age per 1,000 estimated live births	47	47
Deaths per 1,000 population, annual basis, first 44 weeks of year	12.1	11.3
Data from industrial insurance companies:		
Policies in force	68,485,845	67,661,227
Number of death claims	11,908	11,473
Death claims per 1,000 policies in force, annual rate	9.1	8.7
Death claims per 1,000 policies, first 44 weeks of year, annual rate	9.8	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Nov. 7, 1936, and Nov. 9, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 7, 1936, and Nov. 9, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov 7, 1936	Week ended Nov 9, 1935	Week ended Nov 7, 1936	Week ended Nov 9, 1935	Week ended Nov 7, 1936	Week ended Nov 9, 1935	Week ended Nov 7, 1936	Week ended Nov 9, 1935
New England States								
Maine	4	2			12	106	0	6
New Hampshire					3		0	0
Vermont		1			1	21	0	0
Massachusetts	2	8			60	82	2	0
Rhode Island					155	4	0	0
Connecticut	3	2	3	1	36	32	0	0
Middle Atlantic States								
New York	22	39	[1] 8	[1] 5	139	411	9	9
New Jersey	16	10	18	6	48	12	2	0
Pennsylvania	28	39			18	73	6	5
East North Central States.								
Ohio	28	69	6	2	10	56	2	1
Indiana	14	105	10	31	7	9	1	3
Illinois	32	103	13	12	14	13	3	9
Michigan	15	7	1	1	15	26	3	1
Wisconsin	5	6	24	42	16	52	0	1
West North Central States								
Minnesota	48	20	1		19	39	0	0
Iowa	11	16	1	2		6	0	2
Missouri	20	82	49	64	2	9	2	4
North Dakota	1	1				13	0	0
South Dakota		1			1		0	2
Nebraska		6			1	13	0	0
Kansas	21	12			3	4	0	4
South Atlantic States:								
Delaware	1	1			3	29	1	0
Maryland [3]	14	13	8	6	10	2	4	2
District of Columbia	15	18	3	1	5	2	5	2
Virginia	54	86			8	18	3	1
West Virginia	51	48	16	10	10	3	0	1
North Carolina	163	105	5	8	7	1	3	2
South Carolina [3]	22	13	194	114			0	0
Georgia [3]	44	50					0	0
Florida [3]	12	17		2			0	1
East South Central States.								
Kentucky	31	68	10	6	36	44	6	0
Tennessee	36	54	30	22	1		3	2
Alabama [3]	55	37	52	35			0	2
Mississippi	17	24					1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 7, 1936, and Nov. 9, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935
West South Central States:								
Arkansas	8	20	17	2		3	0	0
Louisiana	29	23	36	13	2	13	1	8
Oklahoma [4]	8	18	46	15		4	2	5
Texas [3]	36	178	60	137	22	12	1	0
Mountain States:								
Montana		3	11	5	1	15	0	1
Idaho	2		3		56	8	0	0
Wyoming	2	2			5	13	1	0
Colorado	8	11			1	2	0	1
New Mexico	2	8		3	4		0	0
Arizona	2		43	15	38		0	1
Utah [3]	1				12	4	3	0
Pacific States:								
Washington	4	8	3		24	49	1	0
Oregon [5]	1	1	19	24	1	97	0	0
California	53	54	27	32	22	154	2	5
Total	941	1,384	717	616	828	1,451	67	71
First 45 weeks of year	22,885	30,393	146,005	110,137	275,341	705,648	6,676	4,938

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935
New England States:								
Maine	0	6	17	14	0	0	3	1
New Hampshire	0	0	11	4	0	0	0	0
Vermont	0	1	4	4	0	0	0	0
Massachusetts	0	26	123	191	0	0	4	3
Rhode Island	0	3	12	7	0	0	0	0
Connecticut	0	7	50	32	0	0	0	1
Middle Atlantic States:								
New York	6	25	321	330	0	0	14	13
New Jersey	1	12	39	67	0	0	4	1
Pennsylvania	7	3	213	354	0	0	20	13
East North Central States:								
Ohio	9	2	251	242	0	0	27	10
Indiana	3	3	71	162	3	1	1	5
Illinois	25	6	274	451	1	1	23	17
Michigan	4	8	100	155	1	0	14	6
Wisconsin	1	1	210	315	2	15	2	2
West North Central States:								
Minnesota	1	0	99	233	1	0	0	1
Iowa	8	2	66	97	6	3	5	3
Missouri	5	2	61	100	0	2	7	9
North Dakota	0	3	43	40	5	1	2	0
South Dakota	1	0	31	34	0	11	2	0
Nebraska	1	0	3	31	0	9	0	0
Kansas	6	4	121	90	2	6	6	7
South Atlantic States:								
Delaware	0	0	3	19	0	0	3	1
Maryland [3]	1	4	66	93	0	0	8	22
District of Columbia	0	1	6	10	0	0	1	1
Virginia	2	2	53	56	0	0	19	25
West Virginia	6	2	78	146	0	0	7	10
North Carolina	1	1	81	90	0	2	4	19
South Carolina [3]	0	0	27	5	0	0	2	8
Georgia [3]	4	1	27	22	0	0	12	4
Florida [3]	2	0	6	8	0	0	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 7, 1936, and Nov. 9, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935	Week ended Nov. 7, 1936	Week ended Nov. 9, 1935
East South Central States								
Kentucky	1	8	64	84	0	0	20	12
Tennessee	2	1	37	71	0	0	16	8
Alabama [3]	2	0	21	23	0	0	6	5
Mississippi	3	0	22	19	0	0	8	5
West South Central States.								
Arkansas	8	1	8	10	0	1	4	4
Louisiana	0	4	16	17	0	0	8	14
Oklahoma [4]	31	1	15	14	7	0	18	15
Texas [3]	2	4	22	78	1	0	19	25
Mountain States								
Montana	0	0	40	161	5	34	2	0
Idaho	0	0	38	54	0	0	2	7
Wyoming	0	0	32	16	3	1	0	2
Colorado	10	0	42	106	0	4	0	1
New Mexico	0	0	25	15	0	0	10	22
Arizona	1	0	6	28	0	0	1	0
Utah [2]	0	0	22	69	1	0	0	0
Pacific States								
Washington	2	3	28	72	0	25	4	0
Oregon [5]	3	0	32	45	1	0	5	2
California	11	8	180	235	2	0	14	14
Total	165	155	3,207	4,519	41	116	328	318
First 45 weeks of year	3,914	10,146	204,826	211,936	6,531	5,874	13,021	15,996

[1] New York City only
[2] Week ended earlier than Saturday
[3] Typhus fever, week ended Nov 7, 1936, 33 cases, as follows: South Carolina, 2, Georgia, 12, Florida, 1; Alabama, 12, Texas, 6
[4] Exclusive of Oklahoma City and Tulsa
[5] Rocky Mountain spotted fever, week ended Nov 7, 1936, Oregon, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1936										
New Hampshire		3					1	6	0	0
September 1936										
Hawaii Territory	1	1	14		4		1		0	1
New Hampshire		1					0	14	0	0
October 1936										
Arkansas	1	34	34	90	1	3	14	18	0	23
Connecticut	1	9	3	2	34		4	101	0	8
Delaware		6	7	2	15		0	13	0	12
District of Columbia	8	71	3		20	1	2	42	0	7
Florida	3	43	15	140	3	5	6	24	0	5
Maine	2	11	2	[1] 1	50		4	59	0	6
North Carolina	9	685	24		37	47	5	330	1	59
South Carolina		344	579	2,246	19	76	7	43	0	53

[1] Imported.

September 1936

	Cases
Hawaii Territory:	
Chicken pox	4
Dysentery (amoebic)	1
Leprosy	4
Mumps	45
Typhus fever	6
Whooping cough	7

October 1936

	Cases
Chicken pox:	
Arkansas	2
Connecticut	175
Delaware	10
District of Columbia	12
Florida	3
Maine	108
North Carolina	72
South Carolina	9
Conjunctivitis, infectious:	
Connecticut	2
Dengue:	
Arkansas	1
South Carolina	2
Diarrhea:	
South Carolina	373
Dysentery:	
Connecticut (amoebic)	2
Connecticut (bacillary)	14
Delaware	4
Florida	2

October 1936—Continued

	Cases
German measles:	
Connecticut	11
Delaware	1
Maine	8
North Carolina	13
Hookworm disease:	
South Carolina	121
Impetigo contagiosa:	
Delaware	2
Mumps:	
Arkansas	15
Connecticut	140
Delaware	2
Florida	36
Maine	273
South Carolina	33
Ophthalmia neonatorum:	
Connecticut	1
North Carolina	1
South Carolina	5
Paratyphoid fever:	
Connecticut	11
North Carolina	2
South Carolina	2
Rabies in animals:	
Connecticut	1
South Carolina	29
Rabies in man:	
North Carolina	1
Rocky Mountain spotted fever:	
North Carolina	1

October 1936—Continued

	Cases
Scabies:	
Delaware	1
Septic sore throat:	
Connecticut	8
Maine	7
North Carolina	25
Trachoma:	
Connecticut	1
Typhus fever:	
Florida	8
North Carolina	6
South Carolina	13
Undulant fever:	
Arkansas	3
Connecticut	11
Florida	1
Maine	2
North Carolina	1
South Carolina	1
Vincent's infection:	
Maine	8
Whooping cough:	
Arkansas	5
Connecticut	271
Delaware	22
District of Columbia	92
Florida	14
Maine	113
North Carolina	168
South Carolina	67

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 31, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria, cases	Influenza		Measles, cases	Pneumonia, deaths	Scarlet fever, cases	Smallpox, cases	Tuberculosis, deaths	Typhoid fever, cases	Whooping cough, cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0		0	0	1	1	0	0	0	1	29
New Hampshire:											
Concord	0		0	0	0	0	0	1	0	0	16
Nashua	0			0		1	0		0	0	
Vermont:											
Barre											
Burlington	0		0	0	0	0	0	0	0	0	14
Rutland	0		0	2	1	0	0	0	0	0	7
Massachusetts:											
Boston	1		0	2	9	24	0	5	0	112	222
Fall River	0		0	0	0	2	0	1	0	0	25
Springfield	0		0	0	1	4	0	0	0	1	42
Worcester	0		0	4	6	7	0	1	0	4	45
Rhode Island:											
Pawtucket	0		0	0	0	0	0	0	0	0	16
Providence	1		0	0	5	7	0	1	0	10	67
Connecticut:											
Bridgeport	0		0	6	1	0	0	1	0	4	17
Hartford	0		0	1	0	5	0	0	1	7	35
New Haven	0		0	0	2	0	0	0	0	2	31
New York:											
Buffalo	2		0	7	10	12	0	6	0	8	131
New York	18	10	1	27	81	45	0	72	14	94	1,356
Rochester	0		0	1	4	4	0	2	0	4	56
Syracuse	0		0	0	2	7	0	1	0	19	38
New Jersey:											
Camden	1	1	0	0	1	3	0	1	0	1	30
Newark	0	5	0	0	8	2	0	5	0	40	100
Trenton	0		0	0	3	0	0	1	1	0	36
Pennsylvania:											
Philadelphia	8		3	1	27	36	0	23	5	98	480
Pittsburgh	0	5	3	0	22	23	0	7	1	21	137
Reading	0		1	0	2	0	0	3	0	45	32
Scranton	0			0		0	0		0	0	

City reports for week ended Oct. 31, 1936—Continued

State and city	Diphtheria, cases	Influenza		Measles, cases	Pneumonia, deaths	Scarlet fever, cases	Smallpox, cases	Tuberculosis, deaths	Typhoid fever, cases	Whooping cough, cases	Deaths, all causes
		Cases	Deaths								
Ohio:											
Cincinnati	4	------	2	1	8	5	0	6	1	11	119
Cleveland	7	9	2	2	11	24	0	10	2	23	184
Columbus	5	------	0	0	5	8	0	1	0	6	77
Toledo	0	------	0	0	4	1	0	2	3	14	77
Indiana:											
Anderson	0	------	0	0	2	0	0	0	0	0	4
Fort Wayne	0	------	1	0	1	1	0	1	0	0	18
Indianapolis	3	------	1	2	6	12	0	3	0	4	111
Muncie	0	------	0	0	3	4	0	1	0	0	13
South Bend	0	------	0	0	1	2	0	0	0	2	16
Terre Haute	0	------	0	0	0	6	0	0	0	0	15
Illinois:											
Alton	0	------	0	0	0	2	0	0	0	0	7
Chicago	10	5	3	3	23	95	0	40	6	41	635
Elgin	0	------	0	0	0	0	0	0	0	9	10
Moline	0	------	0	0	0	3	0	0	0	3	6
Springfield	0	------	0	0	1	3	0	0	0	6	23
Michigan:											
Detroit	14	1	0	2	26	69	0	16	0	50	272
Flint	1	------	0	0	5	2	0	0	0	4	22
Grand Rapids	0	------	0	2	1	5	0	0	0	8	23
Wisconsin:											
Kenosha	0	------	0	0	0	6	0	1	0	0	8
Madison	0	------	0	0	0	6	0	1	0	8	19
Milwaukee	1	1	1	0	3	32	1	5	0	23	87
Racine	0	------	0	0	2	10	0	1	0	0	11
Superior	0	------	0	0	0	1	0	0	0	0	4
Minnesota:											
Duluth	0	------	1	1	2	2	0	0	0	2	26
Minneapolis	13	------	2	4	3	14	0	1	0	13	115
St. Paul	0	1	1	2	9	6	0	2	0	14	57
Iowa:											
Cedar Rapids	0	------	--------	0	-------	4	0	-------	0	0	--------
Davenport	1	------	--------	0	-------	0	0	-------	0	0	--------
Des Moines	0	------	--------	0	-------	1	0	-------	0	1	28
Sioux City	0	------	--------	0	-------	5	1	-------	0	3	--------
Waterloo	2	------	--------	0	-------	7	0	-------	0	18	--------
Missouri:											
Kansas City	3	------	1	0	12	26	0	3	0	0	102
St. Joseph	------	------	--------	-------	-------	-------	-------	-------	-------	-------	--------
St. Louis	5	1	0	1	6	13	0	9	2	11	237
North Dakota:											
Fargo	0	------	0	0	0	0	0	0	0	0	10
Grand Forks	0	------	--------	0	-------	0	0	-------	0	0	--------
Minot	0	------	0	0	0	0	0	0	0	0	9
South Dakota:											
Aberdeen	0	------	--------	0	-------	6	0	-------	0	0	--------
Nebraska:											
Omaha	0	------	1	1	6	2	0	2	0	2	54
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	0
Topeka	------	------	--------	-------	-------	-------	-------	-------	-------	-------	--------
Wichita	1	------	0	0	8	10	0	1	0	1	37
Delaware:											
Wilmington	0	------	0	0	1	0	0	2	0	0	19
Maryland:											
Baltimore	6	6	2	10	17	20	0	10	1	105	221
Cumberland	0	------	1	0	1	0	0	0	0	0	12
Frederick	0	------	0	0	0	0	0	0	0	0	1
Dist. of Col.:											
Washington	9	------	0	4	16	15	0	10	0	17	147
Virginia:											
Lynchburg	0	------	0	0	1	3	0	2	0	3	10
Norfolk	0	------	0	0	2	1	0	0	0	0	19
Richmond	0	------	0	0	3	7	0	0	1	3	50
Roanoke	1	------	0	1	3	1	0	0	0	0	20
West Virginia:											
Charleston	0	------	0	1	1	0	0	0	0	0	12
Huntington	4	------	--------	0	-------	5	0	-------	0	0	--------
Wheeling	0	------	0	0	3	0	0	0	0	0	18
North Carolina:											
Gastonia	1	------	--------	0	-------	1	0	-------	0	0	--------
Raleigh	------	------	--------	-------	-------	-------	-------	-------	-------	-------	--------
Wilmington	4	------	0	0	0	1	0	0	0	0	8
Winston-Salem	0	------	0	1	1	0	0	2	0	0	23

City reports for week ended Oct. 31, 1936—Continued

State and city	Diphtheria, cases	Influenza		Measles, cases	Pneumonia, deaths	Scarlet fever, cases	Smallpox, cases	Tuberculosis, deaths	Typhoid fever, cases	Whooping cough, cases	Deaths, all causes
		Cases	Deaths								
South Carolina:											
Charleston	2	1	0	0	0	0	0	0	0	0	15
Columbia	0	------	0	0	2	0	0	0	0	0	24
Florence	0	------	0	0	0	0	0	0	0	0	13
Greenville	3	------	0	0	1	1	0	0	0	0	11
Georgia:											
Atlanta	3	5	2	1	10	8	0	1	1	0	72
Brunswick	0	------	0	0	1	0	0	0	0	0	6
Savannah	1	------	0	0	1	0	0	3	0	0	37
Florida											
Miami	1	3	0	0	1	0	0	3	0	0	26
Tampa	0	------	0	0	4	0	0	0	0	0	22
Kentucky:											
Ashland	------	------	------	------	------	------	------	------	------	------	------
Covington	0	------	0	0	0	0	0	1	0	0	13
Lexington	0	------	0	0	2	2	0	2	0	0	23
Tennessee:											
Knoxville	7	------	1	0	4	0	0	0	0	0	28
Memphis	3	------	2	0	3	7	0	4	3	7	73
Nashville	4	------	0	0	2	0	0	4	1	0	51
Alabama:											
Birmingham	4	------	1	1	6	2	0	7	1	0	80
Mobile	1	1	0	0	0	1	0	1	0	0	23
Montgomery	5	------	------	0	------	0	0	------	1	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	2	0	------	0	0	------
Little Rock	0	------	0	0	2	2	0	0	0	0	------
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	------
New Orleans	3	3	0	0	4	1	0	6	0	1	150
Shreveport	8	------	0	1	7	6	0	4	3	0	51
Oklahoma:											
Oklahoma City	1	------	0	0	9	2	0	1	0	0	40
Tulsa	0	------	------	0	------	7	0	------	1	0	------
Texas:											
Dallas	4	2	2	0	9	3	0	3	0	0	75
Fort Worth	0	------	1	0	4	6	0	1	2	0	36
Galveston	0	------	0	0	6	1	0	0	0	0	18
Houston	6	------	0	0	11	3	0	2	0	0	77
San Antonio	1	------	1	0	10	0	0	8	0	0	67
Montana:											
Billings	1	------	0	0	1	0	0	0	0	0	7
Great Falls	0	------	0	2	1	2	0	0	0	0	8
Helena	0	------	0	1	0	2	0	0	0	0	1
Missoula	0	------	0	0	2	1	0	0	0	0	11
Idaho:											
Boise	0	------	0	0	0	0	0	0	1	0	7
Colorado:											
Colorado Springs	1	------	0	0	0	1	0	0	0	0	5
Denver	6	------	1	0	9	10	0	3	0	26	76
Pueblo	0	------	0	0	0	2	0	1	0	0	12
New Mexico:											
Albuquerque	0	------	0	0	2	8	0	1	0	0	15
Utah:											
Salt Lake City	0	------	0	1	2	7	0	2	0	1	31
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	0	4	3	3	0	2	0	6	90
Spokane	0	1	1	1	3	12	0	0	0	4	34
Tacoma	0	------	0	0	0	3	0	0	0	2	28
Oregon:											
Portland	0	------	0	1	2	5	0	0	2	2	69
Salem	0	3	------	0	------	1	0	------	0	0	------
California:											
Los Angeles	13	9	1	7	15	21	0	16	2	63	283
Sacramento	2	------	0	3	0	35	0	5	0	1	32
San Francisco	1	------	0	0	5	15	0	9	0	25	167

City reports for week ended Oct. 31, 1936—Continued

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
New Hampshire			
Concord	0	0	1
Massachusetts			
Boston	0	1	1
Rhode Island			
Providence	0	1	0
New York			
Buffalo	0	1	0
New York	5	3	1
Syracuse	0	0	1
New Jersey			
Newark	0	0	1
Pennsylvania			
Philadelphia	1	0	2
Pittsburgh	1	1	0
Ohio			
Cincinnati	1	0	0
Cleveland	0	0	1
Columbus	0	0	1
Toledo	0	1	4
Indiana			
Fort Wayne	0	0	1
Muncie	1	1	0
Illinois			
Chicago	4	0	10
Michigan			
Detroit	1	0	1
Wisconsin			
Milwaukee	3	1	0
North Dakota			
Minot	0	0	1
Maryland:			
Baltimore	5	1	0
District of Columbia			
Washington	4	2	0
Virginia			
Roanoke	0	1	0
West Virginia			
Charleston	0	0	1
Georgia			
Atlanta	5	0	1
Florida			
Tampa	0	0	1
Kentucky			
Lexington	1	1	0
Tennessee			
Knoxville	0	0	1
Memphis	2	0	4
Arkansas			
Fort Smith	0	0	1
Louisiana			
New Orleans	1	0	0
Oklahoma			
Oklahoma City	3	0	0
Tulsa	0	0	5
Montana			
Missoula	1	0	0
Colorado			
Denver	0	1	0
Pueblo	0	0	2
Utah			
Salt Lake City	1	0	0
Washington			
Spokane	1	0	0
Oregon			
Portland	0	0	1
California			
Los Angeles	1	0	1
San Francisco	0	0	1

Epidemic encephalitis.—Cases: Oklahoma City, 1.
Pellagra.—Cases: Wilmington, N. C., 1; Savannah, 1; New Orleans, 1; San Francisco, 4.
Rabies in man.—Deaths: Mobile, 1.
Typhus fever.—Cases: New York, 2; Charleston, S. C., 1; Savannah, 2; Tampa, 1; Montgomery, 1.

FOREIGN AND INSULAR

CUBA

Provinces—Notifiable diseases—4 weeks ended October 17, 1936.—During the 4 weeks ended October 17, 1936, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	2		4	1	5	13
Chicken pox					1	4	5
Diphtheria	2	5		3	4	2	16
Hookworm disease				1			1
Leprosy	1	9	1		2		13
Malaria	295	134	56	549	254	534	1,822
Poliomyelitis		2	1				3
Scarlet fever		1		3			3
Tuberculosis	16	21	15	41	18	30	141
Typhoid fever	15	54	14	31	10	30	154

CZECHOSLOVAKIA

Communicable diseases—August 1936.—During the month of August 1936, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	22	2	Paratyphoid fever	31	3
Cerebrospinal meningitis	10	4	Poliomyelitis	43	6
Chicken pox	25		Puerperal fever	23	6
Diphtheria	1,549	90	Scarlet fever	1,627	28
Dysentery	232	38	Trachoma	41	
Influenza	13		Typhoid fever	935	52
Malaria	361	1	Typhus fever	1	

LATVIA

Communicable diseases—July–September 1936.—During the months of July, August, and September 1936, cases of certain communicable diseases were reported in Latvia as follows:

Disease	July	August	September	Disease	July	August	September
Botulism	1		2	Mumps	1	6	3
Cerebrospinal meningitis	10		4	Paratyphoid fever	13	14	6
Diphtheria	47	45	40	Poliomyelitis	2	3	2
Dysentery	1	2		Puerperal septicemia	4	13	6
Erysipelas	33	30	37	Scarlet fever	97	94	136
Influenza	34	39	53	Tetanus	1	1	6
Leprosy	4			Trachoma	52	37	25
Lethargic encephalitis			2	Tuberculosis	377	274	285
Malaria		1		Typhoid fever	49	76	81
Measles	113	20	3	Whooping cough	43	36	14

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for October 30, 1936, pages 1518-31. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued November 27, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Egypt—Girga Province.—During the week ended October 31, 1936, 1 fatal case of plague was reported in Girga Province, Egypt.

Iraq—Baghdad Province.—During the week ended October 31, 1936, 1 case of plague was reported in Baghdad Province, Iraq.

Smallpox

Argentina.—During the month of October 1936, smallpox was reported in Argentina as follows: Corrientes Province, 1 case; Entre Rios Province, 153 cases, 9 deaths; Los Andes Territory, 12 cases; Salta Province, 31 cases, 18 deaths.

Brazil—Bahia.—During the week ended August 29, 1936, 11 cases of smallpox with 2 deaths were reported in Bahia, Brazil.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: July 23, 1936, 1 death at Restrepo; July 12, 1 death at Santander Department; September 15, 1 death in Villavicencio.

Sudan (French)—Banankoro Circle—Segou.—On October 30, 1936, 1 fatal case of yellow fever was reported in Segou, Banankoro Circle, French Sudan.

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UNITED STATES TREASURY DEPARTMENT

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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THE EVALUATION OF HEALTH SERVICES[1]

By JOSEPH W MOUNTIN, *Surgeon, United States Public Health Service*

UNITS OF VALUE

The saving of lives, or, to be more exact, the postponement of death, is commonly stated to be a purpose of health work. This end may be accomplished either by the prevention of disease or by the restoration of health. Maintenance, or, better still, the elevation, of physical and mental efficiency is less tangible as an accomplishment; yet the goal may be accepted as desirable in a highly competitive system. Economic values have a place in public health service and merit careful consideration. It is possible, however, to be much more objective by computing actual money saved to the individual or the extent to which property values have been increased by public health measures than by attempting to estimate the economic worth of the man whose life has been prolonged. Comfort and happiness still constitute the prime concerns of the general public, notwithstanding the fact that many health workers are reluctant about accepting responsibility for the administration of services designed to achieve these aims. Actually some students of welfare go so far as to say that happiness is the best summary measurement of accomplishment in health service.

There is no fundamental disagreement on the appropriateness of most of the foregoing purposes of health service when personal interest or the welfare of a friend or a relative is involved. Sympathy might also prompt extension of this interest to any person whom one regards as a replica or a complement of himself. On the other hand, if conservation of life entails coordinated community effort or the expenditure of public funds, differences of opinion regarding the propriety of such action may be encountered. The reasons are not difficult to understand.

Under varying types of social organization, different characteristics determine the usefulness of an individual. Consequently, it is not uncommon to find persons who question the advisability of organizing community resources to save all lives, irrespective of their economic or social importance. Some with a purely utilitarian point of view

[1] Read before the Annual State Conference of Health Officers and Public Health Nurses, Saratoga Springs, N. Y, June 21, 1936

would set limits beyond which life should not be prolonged through organized social effort. Others like to regard disease as nature's process for eliminating the weak and unfit From another point of view, some diseases might even be considered beneficial. Specific immunity in a few instances can be obtained most effectively through an attack of the disease. The question therefore arises as to whether exposure to infection at a favorable time may not be the type of experience to which the human organism should be subjected.

These broad concepts regarding fundamental units of value could be pursued much further and perhaps with profit. Other considerations make it necessary for the practical health worker to fix on fairly well-defined objectives and to strive for their attainment. Measurement of progress toward these ends, however, must be related to a base line. In the instance of health service, the base line is the health problems of the individual or, if people are considered collectively, the problems of the community.

DEFINITION OF PROBLEM

The total problem is expressed by the amount of illness or disability present in a community and by the hazards to health which exist. One is a direct measure of the effect of a cause and the other is indirect, involving an expression of the danger to health.

Direct measurement.—Perhaps the oldest and most firmly established direct measure of health problems is mortality data. In most areas, deaths are now reported with a high degree of completeness. Death certificates form the basis for a fairly correct count of the people who die. The decedents may be classified according to residence, age, sex, color, and certain other characteristics. It must be recognized, however, that considerable improvement can be made in regard to the accuracy of causes of deaths as stated on the certificates Another defect is that little or nothing is revealed concerning the underlying pathology or the train of circumstances which led up to the final illness.

The available data on morbidity are very meager. Health departments attempt to collect only information regarding the occurrence of communicable diseases and of a few other illnesses directly related to the environment. The incompleteness of communicable disease reports need not be dwelt upon. It is commonly recognized that the fragmentary information which normally comes to the attention of the health authority, in most jurisdictions, is seldom any more than a rough index from which to estimate the true incidence of those diseases. Some industries and sick-benefit organizations keep records on conditions which are compensable or which cause absence from work. The data on general illness which are available through these agencies have distinct value, but factors such as employment effect

a high degree of selection in the individuals who are represented by the figures. Such data, therefore, do not form a reliable basis for judging the manifestation of disease in the general population.

Confronted with this situation, the United States Public Health Service and other agencies interested in the broad question of illness and disability in the general population have resorted to the family canvass method of study. Under this plan, a representative sample of families is visited for the purpose of collecting the desired types of information. This procedure has been followed for several years, but until recently the numbers of individuals included have been small and the samples have been selected from only a few areas, which may not be representative of the United States as a whole. A much more extensive study than any made heretofore is now being conducted under the auspices of the United States Public Health Service and is known as the National Health Inventory. Approximately 750,000 families, distributed over 19 States, are included in the sample. The findings in regard to illness will be related to environmental, social, and other factors which may have been operative in determining the nature and extent of disability or the amount and character of medical care which the people receive. The general principles, as well as the techniques involved, in the family-canvass method of study have been described by Pennell (*1*). The experience to date has demonstrated that this method is thoroughly adaptable to the needs and resources of a local health officer, provided its limitations are understood. Briefly stated, it is possible by using a representative sample of the population to obtain an expression of the amount of illness and disability according to broad categories, and the distribution of these conditions among various classes of people. Considerable refinement in diagnosis can be attained by checking with physicians and clinics.

There are more precise methods for determining illness and disability in selected groups or samples of the population, but these procedures are more expensive than the family canvass. Physical examination, especially of school children, may be cited as a method for revealing the more obvious types of physical defects or fairly well established disease processes. It is possible to estimate the amount of tuberculosis infection by the tuberculin test and to use the Wassermann or similar test for the same purpose with regard to syphilis, although active disease process may not always be revealed by either procedure. A census of patients under treatment by physicians, clinics, and other agencies at a given time may serve as a measure of prevalence for selected diseases. Blood smears, the spleen index, or a history of chills and fever are accepted methods for defining a malaria problem. Examination of stools for intestinal parasites is a procedure falling into the same category as those mentioned. Generally speaking, the more refined techniques are especially useful for

eliciting the presence of a single condition such as tuberculosis, syphilis, malaria, hookworm, or immunity to a specific disease.

Indirect measurement.—Diseases and disabilities, as stated previously, represent only that part of the problem which has become established in the population. Hazards to health constitute the remainder, but they cannot be expressed in exact terms of potential menace since it is not possible to anticipate what combination of circumstances may arise and make the several factors operative. Illness, therefore, is not predictable with any high degree of certainty so far as the individual is concerned; neither can a community be assured that disaster will always follow its failure to institute an obviously needed measure of sanitation. Nevertheless, the health official is in a perfectly tenable position if he recommends immunization against smallpox or diphtheria, even though there is no undue prevalence of either disease, since a low level of immunity in the population increases the possibility of those diseases appearing in epidemic proportions. Failure on the part of a community to purify its water supply, to pasteurize the milk, to safeguard the sanitary quality of the food, or to dispose of its wastes in a proper manner represents unnecessary exposures to risks, irrespective of what the disease experience of the population may have been. Conditions such as lead poisoning and silicosis are peculiar to certain types of industries, and their occurrence is determined very largely by failure to employ recognized preventive measures. There are obvious reasons for the close association of injuries with the rapid movement of traffic and with occupations where a large amount of unguarded mechanical equipment is used. Hazards such as those mentioned, and particularly those related to the physical environment, are tangible. Common experience dictates that the risks involved should not be assumed unnecessarily, irrespective of what the actuarial experience of a particular locality may be.

Statements regarding the effect of personal habits must, as a rule, be made with considerable caution. Aside from the results of gross intemperance and utter disregard for safety, the effect of personal habits on individual or community health is difficult to measure; still there is reason to believe that an individual can, to some extent, influence his health by the observance of accepted rules of hygiene. After a disease process has become established and the outcome is predictable within reasonable limits, a fairly reliable estimate can often be made concerning the influence which a therapeutic measure of known value may exert on the course of the disease. If a person is unwilling or unable to take advantage of such remedial measure, the danger to health created by the disease is increased to an appreciable extent.

The problem, therefore, confronting the health agency is expressed by the actual illnesses and disabilities of a population, by the physical status of the people, and by the hazards peculiar to the environment in which they live or find employment. The condition found at any given time will furnish a base line from which to measure progress or retrogression.

CRITERIA OF PROGRESS

Accomplishment of specific objectives.—The efficiency of health organizations in accomplishing specific objectives is undoubtedly, from the standpoint of health administration, the subject most in need of evaluation. Any fact revealed by such studies should be of immediate practical use. Furthermore, most of the procedures involved in studies of this type are well within the resources of the average health department. Accomplishment may be measured by either of two methods. According to the first method, standards of performance commonly spoken of as representing good practice are accepted *a priori* as objectives, and activities in any type of service are rated according to percentage attainment of the quotas which have been established. The principle underlying this method of evaluation serves as the basis of the Appraisal Form for City Health Work (*2*) and the Appraisal Form for Rural Health Work (*3*). It may safely be assumed that all practical health workers are acquainted with these two forms, and nothing more need be said concerning the fields of usefulness for the forms or the limits within which they may be safely applied as instruments for the evaluation of health service.

The second method of measurement is no more than an extension of the first. The objectives are accepted in the same manner as described in the preceding paragraph, but the effectiveness and economy of different procedures for accomplishing desirable purposes constitute the subjects for measurement. This principle of evaluation may be explained to best advantage by stating a few problems in health administration, some of which have been studied (*4, 5, 6*).

It may be assumed that the health agency concerned should have knowledge of the occurrence of tuberculosis. The question then arises, How can the largest number of cases in the early stages of the disease be located without entailing undue costs?

Screening of dwellings has been demonstrated to be of considerable value in the prevention of malaria. To the mind of the administrator, this provokes three questions: What is involved in rendering mosquito-proof the common type of tenant house? In what way can the screening be accomplished most economically? How can people be induced to maintain the screens?

Presuming that the practice of a mother in caring for her infant can be improved by placing the mother under the guidance of a public

health nurse, one may ask: Are all types of contacts between nurse and mother equally effective? What is the optimum number of contacts? Might not the same purposes be accomplished at a lower cost by using improved techniques in mass education instead of visits by or to the nurse?

These and many other questions could be raised with regard to each item of service that enters into a health program. An answer to any one of them would make the art of administration more exact. But there is a limit to which one can go with this type of inquiry, since the effect of many accepted practices has not been established on a scientific basis. This introduces the next and most difficult task in the evaluation of health procedures.

Effect of procedures.—If the true effect of clinical and public health procedures were known in all cases, the problem of appraisal would be very much simplified. For example, if it could be assumed that tonsils presenting certain physical characteristics should be removed, then a health agency might be rated on its efficiency in accomplishing that purpose. The questions, however, arise: What benefit will accrue to the individual as a result of the surgical operation? Even granting that there is a definite clinical syndrome which portends trouble to the individual, what assurance can be given that a large percentage of examiners will elicit the same findings and exercise judgment that is equally discerning? As a matter of fact, there is evidence (*7*, *8*) which tends to show that physical examination is not an instrument of precision and that clinical judgment is variable.

The difficulty inherent in appraising a procedure such as tonsillectomy becomes even more involved if large numbers of individuals are concerned. The conclusions regarding the effect of this operation would be valid only under circumstances meeting the following requirements: A uniform method must be established for detecting the particular types of diseased tonsils which, under clearly defined circumstances, are certain to undermine health to a degree that is sufficient to justify the risk entailed by the operation itself. The appraiser of a community health service must also know the frequency with which each circumstance is encountered in the population. Since all of these requirements cannot be satisfied, due to insufficient knowledge, it is not possible to develop a method for appraising removal of tonsils that is mathematically exact. Perhaps some may feel that it is unfair to apply these criteria to such a controversial procedure as tonsillectomy.

Tonsillectomy has been selected to illustrate a principle, but in doing so the situation has not been overdrawn. This principle also applies to other broad procedures where action must be taken on the basis of clinical judgment. Physical examination and advice in matters of personal hygiene are subject to the same criticisms from

the standpoint of their insusceptibility to exact appraisal. As a matter of fact, there is little on which to estimate the worth of such service except its volume, and the training, character, and integrity of the worker.

In a more restricted field, such as immunization, it is possible to measure the degree of immunity conferred by inoculation with an appropriate antigen. On the other hand, no one can state exactly the value of that protection to the individual, since the probability of his contracting the disease cannot be estimated. Meanwhile, he may have acquired immunity by some other natural process which perhaps is not understood. In any attempt to determine the value of immunization to large groups of the population, one is certain to encounter difficulties which are greater than those presented by the individual.

Items of sanitation might also be selected to illustrate the inexactness of knowledge concerning the effect of other public health procedures, but those already given should serve as a caution to persons who clamor for a simple but exact instrument for evaluating public health effort. This lack of precise information should not be used to discredit the mature judgment of qualified administrators who are capable of weighing the accumulated experience of the several professional groups participating in health service.

Ultimate purpose.—Attempts to go beyond a determination of the effect of a health procedure on the individual or to express some obvious advantage of health protection to the community immediately lead into the realms of social and economic philosophy. There, one is confronted with the riddle of the universe. On broad social purposes each citizen of a community is likely to place his own values, and these estimates are likely to have an emotional basis. His views concerning such questions may be tinctured with or even directed by personal interests, religious convictions, or political necessities. The underlying philosophy of the professional health worker is almost certain to be determined by the same subtle influences. Therefore nothing much in the way of advance from the standpoint of administrative practice is to be gained from speculations relative to the final benefits which mankind is to derive from efforts to conserve human life. After all, the health worker usually has definite work to perform, and he should be occupied primarily with doing the job in the most effective and economical manner, irrespective of what purpose may be back of life.

SUMMARY

In summary, it may be said that the evaluation of health service, when pursued to its final conclusion, deals with the very end and purpose of human existence and the utility of each individual in the

social organization. Speculations on ultimate values lead only to controversies which contribute little to advancement in health administration.

There are a number of steps in the evaluation of health practices, and in many of these the local health worker can participate. The simpler procedures, and yet those which are most necessary from the standpoint of administration, involve a definition of the health problem and a periodic appraisal of the effectiveness and economy with which the worker directs his efforts toward the accomplishment of specific objectives. A few recognized procedures meet the most rigid requirements in scientific evaluation, while the effects of others are not so well established. The person, busy with routine duties, must of necessity accept as worthy of performance those items of service which carry the approval of careful observers. He can, however, become interested in the general subject of appraisal and lend support to fundamental studies which are designed to reveal the tangible effects of public health procedures on the lives of people.

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TIME CHANGES IN THE MORTALITY FROM ACCIDENTAL MECHANICAL SUFFOCATION AMONG INFANTS UNDER 1 YEAR OLD IN DIFFERENT GEOGRAPHIC REGIONS OF THE UNITED STATES, 1925–32[1]

Studies on the Fatal Accidents of Childhood No. 4

By William M. Gafafer, *Senior Statistician, United States Public Health Service*

In the first paper of the series (*1–3*) certain death registration area data were presented for the year 1930 which showed, among other things, the order of importance of various accidents as causes of death among children under 15 years of age, together with the effect of age changes upon this order. As would be expected, the leading cause of death among the accidental causes was by no means the same for each age. Thus accidental mechanical suffocation was the leading cause for infants under 1 year old. Indeed this cause claimed more than four times as many infants under 1 year as the toll exacted by burns, the specific cause immediately following suffocation in importance. Of the total number of 2,405 infants under 1 year that perished accidentally in 1930, 849, or 35 percent, were mechanically suffocated.

The third and fourth revisions (1920 and 1929) of the Manual of the International List of Causes of Death include under the title "Accidental Mechanical Suffocation" the following: Accidental asphyxia; asphyxia (accident); asphyxiation by falling earth; cave-in (unqualified); overlaid; and suffocation (unqualified) by abnormal atmospheric pressure, by bed clothes, by excavation, and in bed.

While infant mortality from accidental mechanical suffocation has been referred to during and since Biblical times,[2] the references in the medical literature to this cause of death are not as voluminous as might be thought. This is especially true with respect to articles with adequate statistical support. A careful search of the literature disclosed one paper to which reference may be appropriately made at this time, namely, the article by Templeman (*4*) which was published over 40 years ago. This publication deals specifically with overlaying and reports data on the suffocation in this manner of 258 infants in bed. As principal causes of this mortality the author records the ignorance and carelessness of mothers, intoxication, overcrowding, and, possibly, illegitimacy and the insurance of infants. All of the infants that died were under 9 months of age, over half of the deaths occurred during the cold months, and approximately half took place on Saturday nights when, after "receiving their week's wages on Saturday, many * * * among whom these cases are

[1] From the Office of Child Hygiene Investigations, U. S. Public Health Service.

[2] For example, "This woman's child died in the night, because she overlaid it" 1 Kings III, 19. Quoted in Webster's New International Dictionary.

so common, indulge freely in drink and go to bed more or less intoxicated."

Because of the importance of mechanical suffocation among the accidental causes of death of infants under 1 year old, it is purposed in this paper to study primarily certain time changes in the mortality caused by it in different geographic regions of the United States. As in the previous papers, the period of time extends from 1925 through 1932. Comparable figures are available in published volumes of the Bureau of the Census, and mortality is measured in terms of deaths per 100,000 live births.

For the purpose of this inquiry the birth registration States of 1925, consisting of 33 States and the District of Columbia, are divided into 4 broad groups, each comprising a geographic region as indicated: A Northeastern (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the District of Columbia), a North Central (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Ohio, West Virginia, and Wisconsin), a Southeastern (Florida, Kentucky, Mississippi, North Carolina, and Virginia) and a Western (California, Montana, Oregon, Utah, Washington, and Wyoming). In the Southeastern region the white and colored deaths are held separate.

RELATION OF ACCIDENTAL CAUSES OF DEATH TO OTHER CAUSES IN 1932

With the use of the most recently published mortality statistics, figure 1 shows the percentage distribution of the deaths from various causes among infants under 1 year old that occurred in the death registration area in 1932.[3] The causes are arranged in order of importance, the cause accounting for the largest percentage of deaths appearing first. There were altogether 121,365 deaths, of which 27 percent were attributed to the leading cause, namely, premature birth. From premature birth to broncho-pneumonia and capillary bronchitis, which immediately follows, there is a sharp drop from 27 to 10 percent. Subsequently the percentage distribution declines rapidly to the accidental causes, from which 1,921 infants died, or more than 1.5 percent of the total number that died. Syphilis, with its 1,647 deaths, follows the accidental causes, and thereafter the distribution slowly declines.

[3] The numbers 1-35 in figure 1 correspond to the different causes, as follows: 1, premature birth; 2, broncho-pneumonia and capillary bronchitis; 3, diarrhea and enteritis; 4, congenital malformation; 5, injury at birth; 6, ill-defined causes of death; 7, other diseases peculiar to early infancy; 8, lobar pneumonia and pneumonia unspecified, 9, all other causes; 10, congenital debility; 11, influenza, 12, whooping cough; 13, **accidental, other, or undefined**; 14, syphilis; 15, diseases of thymus gland; 16, intestinal obstruction; 17, convulsions; 18, bronchitis, 19, erysipelas; 20, diseases of stomach (cancer excepted); 21, diseases of ear; 22, dysentery; 23, simple meningitis, 24, measles, 25, diphtheria, 26, tuberculosis of meninges and central nervous system, 27, tuberculosis of respiratory system; 28, epidemic cerebrospinal meningitis, 29, rickets; 30, other forms of tuberculosis, 31, malaria; 32, diseases of mastoid process; 33, homicide; 34, tetanus; and 35, scarlet fever.

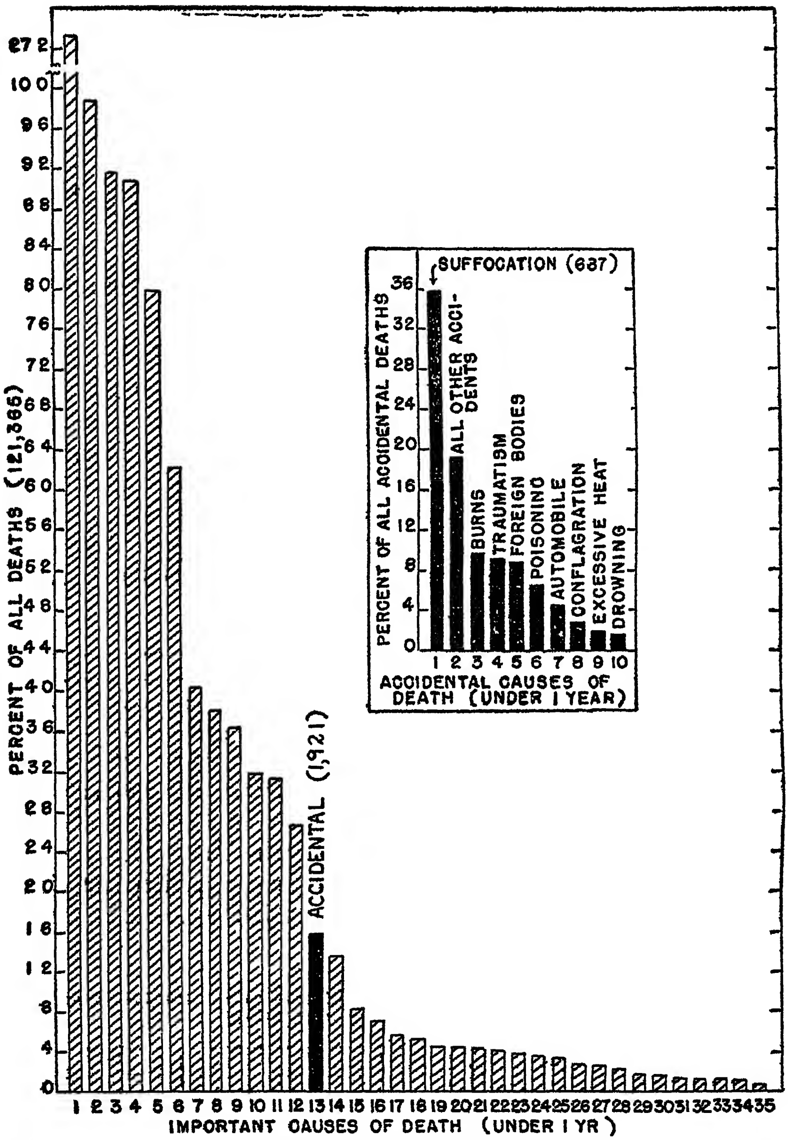

FIGURE 1.—Percentage distribution of the 121,365 deaths among infants under 1 year old arranged in decreasing order of magnitude, death registration area, 1932. The numbers 1–35 indicate the order of importance of the causes and refer to the causes themselves. (See footnote 3 for the causes that correspond to the different numbers.)

* The insert shows the percentage distribution of the 1,921 accidental deaths according to specific causes. Number of deaths from suffocation, 687.

The insert in figure 1 shows how the 1,921 accidental deaths among infants under 1 year were distributed according to specific causes. The importance of accidental mechanical suffocation as a cause of death is well illustrated. In the death registration area in 1932, mechanical suffocation accounted for 687 infant deaths, or 36 percent of all accidental deaths among infants under 1 year. This percentage, which is almost four times the percentage for burns, the specific cause of death immediately following, is practically identical with the corresponding percentage found above for the death registration area in 1930.

MORTALITY FROM ACCIDENTAL MECHANICAL SUFFOCATION, BY GEOGRAPHIC REGION, 1925–32

Table 1 gives the mortality per 100,000 live births from accidental mechanical suffocation among infants under 1 year old in the different geographic regions from 1925 through 1932. For the Southeastern region the colors are given separately. Before proceeding to the examination of the graphical presentation of the mortality rates it will be of interest to inspect the average annual mortality rates of the regions based upon the data for the entire 8 years. These have been calculated from the table and they may be arranged in descending order of magnitude, as follows:

Southeastern, colored	76. 1
North Central	39. 8
Southeastern, white	38. 3
Western	33. 3
Northeastern	25. 5

Thus the rate (deaths per 100,000 live births) for the colored of the Southeastern region is approximately from two to three times any of the remaining rates. The rates for the North Central region and for the white infants of the Southeastern region are similar, whereas the rates for the Western and Northeastern regions are definitely lower.

TABLE 1.—*Mortality from accidental mechanical suffocation, infants under 1 year old, by geographic region, 1925–32*

Accidental mechanical suffocation (under 1 year)	1925	1926	1927	1928	1929	1930	1931	1932
	Northeastern							
Number of deaths	190	224	160	185	157	166	164	134
Per 100,000 live births	20 0	31.7	22.4	26.8	23.7	25.0	26.1	22.2
	North Central							
Number of deaths	259	324	294	259	291	264	212	229
Per 100,000 live births	36 5	46 6	42 3	38.2	44.0	39.5	33.4	38.1

TABLE 1.—*Mortality from accidental mechanical suffocation, in infants under 1 year old, by geographic region, 1925–32*—Continued

Accidental mechanical suffocation (under 1 year)	1925	1926	1927	1928	1929	1930	1931	1932
	Southeastern							
Number of deaths								
Total	155	172	142	140	128	144	89	107
White	82	100	78	80	73	73	44	68
Colored	73	72	64	60	55	71	45	39
Per 100,000 live births								
Total	54 8	60 1	49 4	50 9	49 2	54 2	34 6	40 3
White	40 7	49 2	38 1	40 9	39 5	38 4	23 9	36 0
Colored	89 5	86 6	77 7	75 8	72 9	93 8	61 6	50.9
	Western							
Number of deaths	53	45	54	43	56	53	37	50
Per 100,000 live births	34 4	30 2	36 1	29 0	38 8	35 8	25 9	36.3

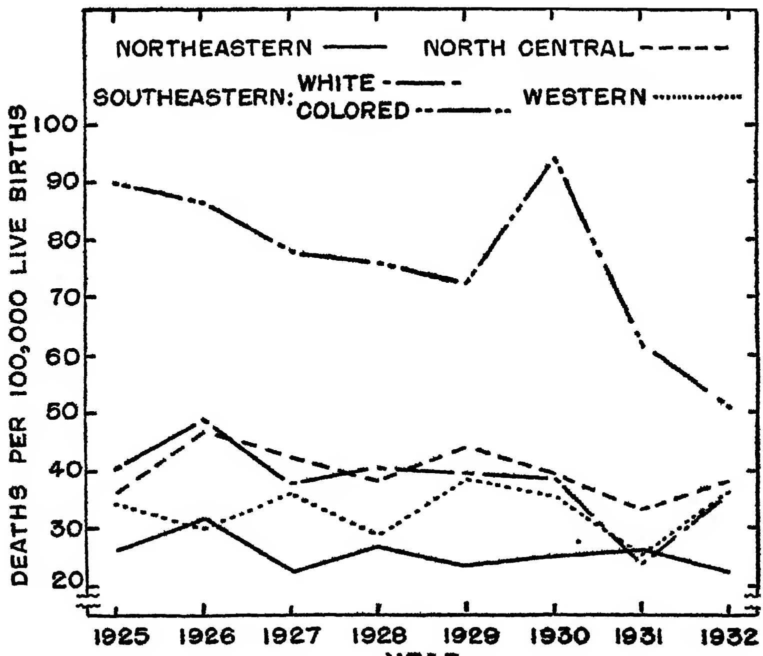

FIGURE 2—Deaths from accidental mechanical suffocation per 100,000 live births among infants under 1 year old in different geographic regions of the United States, 1925–32

The annual mortality rates as given in table 1 are presented graphically in figure 2. The figure discloses a number of important facts which may be briefly recorded as follows: First, the consistently high mortality suffered during the entire period by the colored infants of the Southeastern region; second, with the exception of the 2 years, 1926 and 1931, the Northeastern region shows the lowest mortality;

third, during the whole period the Western region is consistently lower than the North Central; fourth, the rates for the white infants of the Southeastern region show, relatively, considerable fluctuation, and hence no definite orderliness in relation to the other rates; and fifth, which is perhaps the most important fact, the time trends of mortality during the 8 years, while of unlike magnitude in the different regions, are practically level for all of the regions with the possible exception of the trends for the white and the colored infants of the Southeastern region, which are perceptibly declining and at approximately the same rate.

SUMMARY

This paper investigates time changes in the mortality from accidental mechanical suffocation among infants under 1 year old in different geographic regions of the United States from 1925 through 1932. Mortality is measured in terms of deaths per 100,000 live births.

The birth registration States of 1925, consisting of 33 States and the District of Columbia, are divided into 4 broad groups, each comprising a geographic region as follows: A Northeastern, a North Central, a Southeastern (white and colored), and a Western.

The data show that, during the 8 years under observation, the colored infants of the Southeastern region consistently suffered the highest mortality while, in general, the infants of the Northeastern region suffered the lowest mortality. The most important finding is that the time trends of the mortality for all of the regions, with the possible exception of those for the white and colored infants of the Southeastern region, are practically level, indicating that the force of the mortality from accidental mechanical suffocation in the Northeastern, North Central, and Western regions, while of unlike magnitude in the different regions, was practically constant during the 8 years 1925–32. On the other hand, the trends for the white and colored infants of the Southeastern region perceptibly declined and at rates of approximately the same magnitude.

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DEATHS DURING WEEK ENDED NOVEMBER 7, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 7, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8,282	7,730
Deaths per 1,000 population, annual basis	11.6	10.8
Deaths under 1 year of age	578	470
Deaths under 1 year of age per 1,000 estimated live births	52	44
Deaths per 1,000 population, annual basis, first 45 weeks of year	12.1	11.3
Data from industrial insurance companies:		
Policies in force	68,553,251	67,689,195
Number of death claims	10,197	10,029
Death claims per 1,000 policies in force, annual rate	7.8	7.7
Death claims per 1,000 policies, first 45 weeks of year, annual rate	9.8	9.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 14, 1936, and November 16, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 14, 1936, and Nov. 16, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935
New England States:								
Maine	2	1	1		10	85	0	1
New Hampshire					3		0	0
Vermont		1			1	49	0	0
Massachusetts	9	8			103	80	2	2
Rhode Island	2	1			54	19	2	0
Connecticut	1	3	5	3	22	52	0	1
Middle Atlantic States:								
New York	32	24	[1] 7	[1] 7	97	350	12	5
New Jersey	13	20	6	9	50	14	1	3
Pennsylvania	50	62			44	69	3	2
East North Central States:								
Ohio	57	89	32	52	16	63	4	4
Indiana	39	75	13	23	4	18	1	1
Illinois	43	73	10	24	11	14	6	8
Michigan	25	36	2	1	34	13	1	3
Wisconsin	5	3	31	43	21	42	0	0
West North Central States:								
Minnesota	14	7	1	1	41	45	1	1
Iowa	4	23	4	3	2	5	2	1
Missouri	32	76	56	73	4	31	0	1
North Dakota	5	1	6	5	1	11	0	0
South Dakota		5			4	2	0	0
Nebraska	5	17			3	47	1	0
Kansas	55	26	5	8	2	3	1	0
South Atlantic States:								
Delaware	1				5	125	0	0
Maryland [2]	26	21	3	2	28	8	5	3
District of Columbia	11	15		1		1	3	6
Virginia	60	72			23	26	7	0
West Virginia	35	42	59	20	23	14	3	1
North Carolina [3]	123	74	7	8	34	9	4	2
South Carolina [4]	19	15	313	147	6	1	2	0
Georgia [4]	64	41					0	0
Florida	6	21	3	1		4	2	0
East South Central States:								
Kentucky	29	44	15	1	7	7	6	0
Tennessee	50	61	52	16	3	4	6	3
Alabama [4]	65	44	27	31	1	6	1	4
Mississippi [2] [4]	10	10					1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 14, 1936, and Nov. 16, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935
West South Central States:								
Arkansas	16	12	12	13	1		1	0
Louisiana	17	32	10	6	8	10	1	1
Oklahoma [5]	17	25	42	50	1		0	0
Texas [4]	30	155	121	92	15	14	3	1
Mountain States:								
Montana	2		5	3	4	22	0	0
Idaho		1	4	1	7	3	3	0
Wyoming		3			4	5	0	1
Colorado	9	13			2	3	1	2
New Mexico	4	6			5	18	0	0
Arizona	5	1	58	32	37	1	0	2
Utah [2]					13	3	2	0
Pacific States:								
Washington					6	92	0	2
Oregon	2	1	20	28	7	153	2	2
California	61	49	31	52	19	140	3	0
Total	1,064	1,300	970	756	789	1,681	93	63
First 46 weeks of year	23,949	31,702	147,875	110,293	276,130	707,329	6,760	5,001

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935
New England States:								
Maine	0	3	21	12	0	0	0	0
New Hampshire	0	1	4	10	0	0	0	0
Vermont	0	1	7	13	0	0	1	4
Massachusetts	0	10	105	175	0	0	0	1
Rhode Island	0	5	14	12	0	0	1	0
Connecticut	0	3	38	27	0	0	0	2
Middle Atlantic States:								
New York	7	22	271	390	0	0	14	11
New Jersey	1	8	53	95	0	0	5	7
Pennsylvania	6	2	324	395	0	0	44	14
East North Central States:								
Ohio	10	0	270	441	1	0	30	11
Indiana	0	4	101	176	1	2	1	0
Illinois	25	3	286	451	1	3	24	6
Michigan	5	6	231	171	1	0	9	8
Wisconsin	1	2	203	311	1	16	1	5
West North Central States:								
Minnesota	2	1	121	238	2	0	1	1
Iowa	2	2	67	84	6	2	7	9
Missouri	6	2	103	125	1	4	23	3
North Dakota	2	0	57	48	10	2	3	2
South Dakota	0	1	37	35	7	6	2	0
Nebraska	1	0	33	77	0	72	0	0
Kansas	4	0	90	140	1	11	6	7
South Atlantic States:								
Delaware	0	0	7	6	0	0	1	3
Maryland [2]	3	1	71	80	0	0	8	12
District of Columbia	0	0	12	8	0	0	0	1
Virginia	1	2	53	74	0	0	7	10
West Virginia	0	0	72	132	0	1	7	6
North Carolina [3]	0	7	94	56	0	0	4	3
South Carolina [4]	1	0	8	11	0	0	2	5
Georgia [4]	7	1	32	43	0	0	12	6
Florida	1	0	2	11	0	0	0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 14, 1936, and Nov. 16, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935	Week ended Nov. 14, 1936	Week ended Nov. 16, 1935
East South Central States:								
Kentucky	3	3	47	59	0	0	19	14
Tennessee	10	4	68	96	1	1	22	11
Alabama [4]	1	2	31	27	0	0	6	10
Mississippi [2] [4]	3	0	26	13	0	0	3	6
West South Central States:								
Arkansas	7	0	19	7	0	0	14	2
Louisiana	2	2	17	8	1	0	6	11
Oklahoma [5]	25	1	23	13	1	0	9	11
Texas [4]	3	0	47	66	1	0	10	27
Mountain States:								
Montana	0	0	50	120	8	277	5	4
Idaho	0	0	31	63	1	0	7	2
Wyoming	1	0	15	41	1	2	0	1
Colorado	10	4	42	86	1	7	0	3
New Mexico	1	0	14	23	0	0	5	9
Arizona	1	0	29	17	0	0	1	0
Utah [2]	0	0	13	83	1	0	0	0
Pacific States:								
Washington	1	1	46	52	0	33	1	3
Oregon	0	6	37	53	0	0	0	5
California	8	12	211	250	0	0	6	14
Total	161	122	3,613	4,927	48	439	327	275
First 46 weeks of year	4,075	10,268	208,439	216,863	6,570	6,313	13,318	16,271

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Nov. 14, 1936: North Carolina, 1 case.
[4] Typhus fever, week ended Nov. 14, 1936, 35 cases, as follows: South Carolina, 1; Georgia, 24; Alabama, 3; Mississippi, 1; Texas, 6.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1936										
Idaho	1	3	21		169		3	156	6	14
Indiana	15	145	117		12		22	356	4	33
Iowa	6	28	7		15		27	252	20	22
Nebraska	2	7	1		8		5	91	7	3
New Jersey	6	55	44	3	127		5	140	0	19
New Mexico	1	26	6	32	80	1	9	58	0	86
North Dakota	1	4	9		5		5	100	27	8
West Virginia	1	171	67		19		19	348	0	90
Wyoming		2			4		2	36	5	3

Disease and State	Cases
Anthrax:	
New Jersey	1
Chicken pox:	
Idaho	43
Indiana	110
Iowa	123
Nebraska	43
New Jersey	327
New Mexico	21
North Dakota	53
West Virginia	78
Wyoming	65
Conjunctivitis:	
Idaho	4
New Mexico	1
Dysentery:	
Iowa (amoebic)	1
Iowa (bacillary)	2
New Jersey (amoebic)	3
New Jersey (bacillary)	9
New Mexico (amoebic)	2
New Mexico (bacillary)	12
New Mexico (unspecified)	15
Epidemic encephalitis:	
Indiana	1
New Jersey	3
New Mexico	1
Wyoming	1
German measles:	
Idaho	1
New Jersey	77
New Mexico	8
Impetigo contagiosa:	
Idaho	73
Iowa	18
Mumps:	
Idaho	30
Indiana	24
Iowa	19
Nebraska	24
New Jersey	173
New Mexico	15
North Dakota	27
West Virginia	15
Wyoming	10
Ophthalmia neonatorum:	
New Jersey	6
Paratyphoid fever:	
New Jersey	1
West Virginia	2
Wyoming	1
Puerperal septicemia:	
New Mexico	1
Rabies in animals:	
Indiana	18
New Jersey	0
New Mexico	6
Rabies in man:	
New Jersey	1
Scabies:	
Idaho	35
Septic sore throat:	
Idaho	7
Nebraska	1
New Mexico	1
Tetanus:	
New Jersey	1
Trachoma:	
Iowa	3
North Dakota	6
Trichinosis:	
New Jersey	1
Tularaemia:	
Iowa	2
Wyoming	3
Undulant fever:	
Indiana	1
Iowa	15
New Jersey	6
New Mexico	1
West Virginia	1
Wyoming	1
Vincent's infection:	
Idaho	2
Indiana	1
North Dakota	17
Whooping cough:	
Idaho	13
Indiana	64
Iowa	93
Nebraska	30
New Jersey	370
New Mexico	12
North Dakota	2
West Virginia	66
Wyoming	14

PLAGUE INFECTION IN SAN BERNARDINO COUNTY, CALIF.

Plague infection has been reported proved, by animal inoculation, in fleas taken from 24 ground squirrels, *Citellus beecheyi fisheri*, shot October 10, 1936, in Holcomb Valley, 6 miles north of Pine Knot, in San Bernardino County, Calif.

CASES OF VENEREAL DISEASES REPORTED FOR SEPTEMBER 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevelance of the venereal diseases. The figures are taken from reports received from State and city health officers They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama [1]				
Arizona	37	0.96	74	1.92
Arkansas	241	1.21	142	.71
California	1,358	2.11	1,484	2.63
Colorado [2]				
Connecticut	198	1.15	123	.72
Delaware	109	4.26	51	1.99
District of Columbia	196	3.30	221	3.72
Florida	227	1.41	93	.58
Georgia	1,278	3.82	572	1.71
Idaho	18	.38	31	.65
Illinois	1,117	1.43	1,181	1.51
Indiana	102	.30	116	.34
Iowa [3]	127	.50	187	.74
Kansas	86	.47	49	.27
Kentucky	331	1.16	257	.90
Louisiana	121	.57	72	.34
Maine [3]	44	.52	58	.69
Maryland	840	5.09	534	2.60
Massachusetts	463	1.06	571	1.31
Michigan	633	1.30	705	1.51
Minnesota	306	1.16	331	1.26
Mississippi	1,715	8.75	2,300	12.19
Missouri	212	.54	245	.63
Montana [3]	45	.85	65	1.22
Nebraska	31	.23	52	.38
Nevada [2]				
New Hampshire	14	.28	7	.14
New Jersey [1]				
New Mexico	48	1.19	46	1.14
New York	7,196	5.58	2,260	1.75
North Carolina	1,821	5.33	674	1.97
North Dakota	13	.10	51	.73
Ohio [3]	541	.81	325	.48
Oklahoma [3]	166	.66	167	.67
Oregon	43	.43	118	1.17
Pennsylvania [4]	274	.27	154	.15
Rhode Island	98	1.44	65	.95
South Carolina [3]	297	1.48	396	1.97
South Dakota	8	.12	45	.67
Tennessee [3]	515	1.77	268	.92
Texas	275	.45	101	.17
Utah [2]				
Vermont	33	.88	32	.85
Virginia	467	1.77	277	1.05
Washington	194	1.19	424	2.60
West Virginia	214	1.18	117	.64
Wisconsin [5]	26	.06	167	.57
Wyoming [2]				
Total	22,087	1.86	15,101	1.27

See footnotes at end of table.

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio [1]				
Atlanta, Ga.[1]				
Baltimore, Md.[1]				
Birmingham, Ala	146	5.17	51	1.81
Boston, Mass	204	2.58	225	2.85
Buffalo, N. Y.[1]				
Chicago, Ill	632	1.77	886	2.48
Cincinnati, Ohio [1]				
Cleveland, Ohio [1]				
Columbus, Ohio [1]				
Dallas, Tex	83	2.87	22	.76
Dayton, Ohio [1]				
Denver, Colo	50	1.69	47	1.58
Detroit, Mich.[1]				
Houston, Tex.[6]	249	7.44	71	2.21
Indianapolis, Ind.[1]				
Jersey City, N. J.[1]				
Kansas City, Mo.[1]				
Los Angeles, Calif	361	2.52	368	2.57
Louisville, Ky	331	10.21	257	7.93
Memphis, Tenn.[1]				
Milwaukee, Wis.[1]				
Minneapolis, Minn	60	1.23	125	2.57
Newark, N. J.[1]				
New Orleans, La.[1]				
New York, N. Y	6,149	8.42	1,446	1.98
Oakland, Calif	36	1.19	55	1.81
Omaha, Nebr.[1]				
Philadelphia, Pa.[1]				
Pittsburgh, Pa.[1]				
Portland, Oreg.[1]				
Providence, R. I.[1]				
Rochester, N. Y.[1]				
St. Louis, Mo	248	2.97	66	.79
St. Paul, Minn	17	.60	44	1.56
San Antonio, Tex	9	.36	29	1.15
San Francisco, Calif.[1]				
Seattle, Wash	103	2.71	197	5.19
Syracuse, N. Y.[1]				
Toledo, Ohio	41	1.35	28	.92
Washington, D. C.[7]	196	3.94	221	4.45

[1] No report for current month.
[2] Not reporting.
[3] Incomplete.
[4] Includes only those cases that enter the clinic conducted by the State department of health.
[5] Only cases of syphilis in the infectious stage are reported.
[6] Reported by the Jefferson Davis Hospital; physicians are not required to report venereal diseases.
[7] Reported by the Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 7, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	7	2	0	1	0	0	40
New Hampshire:											
Concord	0	------	0	0	1	0	0	0	0	0	8
Manchester	0	------	0	0	1	0	0	1	0	0	20
Nashua	0	------	------	0	------	1	0	------	0	0	------
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	0	14
Rutland	0	------	0	0	1	0	0	0	0	0	8
Massachusetts:											
Boston	1	------	0	4	21	29	0	12	2	96	231
Fall River	0	------	0	0	3	1	0	0	0	0	23
Springfield	0	------	0	0	0	1	0	0	1	8	25
Worcester	0	------	0	20	6	3	0	1	0	31	54
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	22
Providence	0	------	0	0	5	8	0	4	0	7	68
Connecticut:											
Bridgeport	1	------	0	11	0	1	0	0	0	0	29
Hartford	0	------	0	1	5	22	0	2	0	3	41
New Haven	0	------	0	0	3	2	0	1	0	9	51
New York:											
Buffalo	0	------	0	9	6	13	0	6	0	11	136
New York	18	8	1	33	85	76	0	84	7	66	1,411
Rochester	0	------	0	1	5	3	0	3	0	3	76
Syracuse	0	------	1	0	1	1	0	0	0	29	37
New Jersey:											
Camden	4	------	0	0	0	0	0	2	1	3	36
Newark	0	------	0	0	4	4	0	4	0	26	73
Trenton	0	------	1	0	4	1	0	1	0	0	38
Pennsylvania:											
Philadelphia	2	------	5	3	21	53	0	26	3	136	444
Pittsburgh	7	1	1	3	31	45	0	6	0	19	186
Reading	0	------	0	0	1	5	0	1	0	21	18
Scranton	0	------	------	0	------	3	0	------	0	1	------
Ohio:											
Cincinnati	5	------	6	1	19	5	0	4	1	11	142
Cleveland	1	9	0	2	11	23	0	14	2	32	211
Columbus	2	------	0	1	3	8	0	1	0	5	88
Toledo	1	1	1	1	7	3	0	5	1	6	76
Indiana:											
Anderson	0	------	0	0	1	4	0	0	0	0	8
Fort Wayne	0	------	1	0	1	2	0	1	0	0	26
Indianapolis	1	------	0	3	9	7	0	1	1	1	90
Muncie	0	------	0	0	1	4	0	0	0	0	12
South Bend	0	------	0	0	2	1	0	0	0	8	18
Terre Haute	0	------	0	0	0	2	0	0	0	0	14
Illinois:											
Alton	0	------	0	0	2	1	0	0	0	0	16
Chicago	6	7	3	5	40	122	0	35	1	47	635
Elgin	0	------	0	0	2	0	0	0	0	5	11
Moline	0	------	0	1	0	1	0	0	0	1	7
Springfield	0	------	0	1	2	0	0	0	0	5	18
Michigan:											
Detroit	12	1	0	1	19	74	0	16	2	68	276
Flint	0	------	0	2	3	7	0	0	0	3	21
Grand Rapids	0	------	0	4	1	5	0	1	0	8	35
Wisconsin:											
Kenosha	0	------	0	0	0	5	0	0	0	0	5
Madison	0	------	0	0	1	2	0	0	0	13	13
Milwaukee	0	2	2	0	9	23	0	3	0	33	105
Racine	1	------	0	0	0	3	0	2	0	1	14
Superior	0	------	0	1	0	1	0	0	0	3	4
Minnesota:											
Duluth	0	------	0	0	1	19	0	0	0	6	25
Minneapolis	19	------	0	0	10	13	0	0	0	7	103
St. Paul	0	1	1	2	6	10	0	0	1	9	57

City reports for week ended Nov. 7, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0			0		0	0		0	0	
Davenport	0			0		0	0		0	0	
Des Moines	1			0		3	0		0	0	31
Sioux City	1			0		2	1		0	3	
Waterloo	1			1		3	0		0	8	
Missouri:											
Kansas City	2		0	1	14	10	0	3	0	2	92
St. Joseph											
St. Louis	2		0	2	10	18	0	3	1	7	198
North Dakota:											
Fargo	0		0	0	1	1	0	0	0	0	12
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	8
South Dakota:											
Sioux Falls	0		0	0	0	0	0	0	0	0	13
Nebraska:											
Omaha	0		0	1	12	2	0	2	0	0	63
Kansas:											
Lawrence	0	2	1	0	1	0	0	0	0	0	10
Topeka	0		1	0	2	1	0	0	0	0	22
Wichita	0	1	1	0	3	7	0	1	0	0	21
Delaware:											
Wilmington	1		0	0	3	0	0	0	0	3	25
Maryland:											
Baltimore	4	7	3	5	12	20	0	19	3	68	229
Cumberland	0		0	1	1	1	0	1	0	6	11
Frederick	0		0	0	0	1	0	0	0	0	6
District of Columbia:											
Washington	15	3	0	5	16	18	0	18	1	27	177
Virginia:											
Lynchburg	0		0	1	0	3	0	1	0	3	17
Norfolk	0		0	0	1	3	0	2	0	0	51
Richmond	5		1	0	6	3	0	1	2	0	
Roanoke	1		0	0	3	1	0	0	0	1	23
West Virginia:											
Charleston	1	1	0	0	3	0	0	0	0	0	14
Huntington	3			0		5	0		0	0	
Wheeling	0		0	0	1	2	0	0	0	3	17
North Carolina:											
Gastonia	1		0	0	0	0	0	0	0	0	
Raleigh											
Wilmington	4		0	0	0	2	0	0	0	2	14
Winston-Salem	0		0	0	2	3	0	1	0	0	16
South Carolina:											
Charleston	5	1	0	0	2	3	0	2	0	0	21
Columbia	0		1	0	6	0	0	0	0	0	31
Florence	0		0	0	3	0	0	2	0	0	11
Greenville	0		0	0	0	1	0	1	0	0	8
Georgia:											
Atlanta	9	12	0	0	4	12	0	4	0	0	93
Brunswick	0		0	0	0	1	0	1	0	0	5
Savannah	2	1		0	1	1	0	0	0	1	30
Florida:											
Miami	1		0	0	0	0	0	0	0	0	19
Tampa	1		0	0	1	0	0	0	0	1	18
Kentucky:											
Ashland	1		0	0	0	3	0	2	0	0	15
Covington	0		0	0	0	0	0	0	0	0	13
Lexington	0		0	5	1	0	0	2	2	0	24
Tennessee:											
Knoxville	5		0	1	2	0	0	1	0	0	21
Memphis	4		0	0	15	12	0	4	0	1	122
Nashville	0		3	0	4	2	0	1	0	0	64
Alabama:											
Birmingham	4	1	1	0	7	3	0	2	0	0	62
Mobile	4		1	0	0	1	0	2	0	0	21
Montgomery	1			0		0	0		0	0	
Arkansas:											
Fort Smith	2			0		3	0		0	0	
Little Rock	0		0	0	5	0	0	3	0	0	8
Louisiana:											
New Orleans	11	4	0	0	21	4	0	7	0	1	148
Shreveport	0		0	0	7	0	0	1	0	0	36
Oklahoma:											
Oklahoma City	1	10	0	0	7	4	0	3	0	0	47
Tulsa	1			0	0	5	0	0	4	0	

City reports for week ended Nov. 7, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	2	5	5	0	8	4	0	1	0	1	63
Fort Worth	3		0	0	4	2	0	1	1	0	30
Galveston	0		0	0	1	0	0	1	0	0	16
Houston	1		0	0	7	2	0	3	1	0	73
San Antonio	0		2	0	4	0	0	3	0	0	66
Montana:											
Billings	0		0	0	1	1	1	0	0	0	6
Great Falls	0		0	0	2	0	0	0	0	4	9
Helena	0		0	0	2	0	0	0	0	0	6
Missoula	0		0	1	1	0	0	0	0	0	10
Idaho:											
Boise											
Colorado:											
Colorado Springs	0		0	0	0	0	0	0	0	0	4
Denver	2		1	1	4	10	0	2	0	34	90
Pueblo	0		0	0	0	0	1	0	1	0	9
New Mexico:											
Albuquerque	0		0	1	2	2	0	3	0	0	10
Utah:											
Salt Lake City	0		0	0	0	6	0	1	0	3	27
Nevada:											
Reno											
Washington:											
Seattle	0		3	2	7	2	0	1	2	3	89
Spokane	0		0	1	3	23	0	0	0	1	37
Tacoma	0		0	0	2	0	0	0	1	0	24
Oregon:											
Portland	0	2	1	0	7	7	0	0	3	1	87
Salem	1			0		1	0		0	2	
California:											
Los Angeles	15	6	0	3	18	23	0	21	0	53	307
Sacramento	3		0	4	5	37	0	0	1	2	39
San Francisco	4		0	2	5	17	0	7	0	22	179

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	2	1	0
New York:			
New York	9	2	1
Syracuse	0	0	1
New Jersey:			
Newark	2	0	1
Pennsylvania:			
Philadelphia	0	0	1
Pittsburgh	2	0	0
Ohio:			
Cincinnati	1	0	0
Indiana:			
Indianapolis	0	1	1
Springfield	3	0	0
Michigan:			
Detroit	1	0	4
Minnesota:			
Minneapolis	0	1	0
Missouri:			
Kansas City	0	0	1
St. Louis	2	0	2
Maryland:			
Baltimore	3	0	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
District of Columbia:			
Washington	5	2	0
Virginia:			
Norfolk	1	0	0
Florida:			
Miami	1	1	2
Tennessee:			
Memphis	0	1	1
Arkansas:			
Fort Smith	0	0	1
Louisiana:			
New Orleans	1	0	0
Oklahoma:			
Oklahoma City	1	0	0
Tulsa	0	0	14
Texas:			
Houston	0	1	0
Montana:			
Missoula	0	1	0
Oregon:			
Portland	0	0	1
California:			
Los Angeles	0	0	4

Epidemic encephalitis.—Cases: New York, 2; Philadelphia, 1; Detroit, 1; Charleston, S. C., 1.
Pellagra.—Cases: Boston, 1; Wilmington, N. C., 1; Savannah, 1; Birmingham, 1; Mobile, 1.
Rabies in man.—Deaths: St. Louis, 1.
Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 2; Savannah, 2; Montgomery, 1; Houston, 1.
Smallpox.—Deaths: Muncie, Ind., 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended October 31, 1936.—During the 2 weeks ended October 31, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	1				1	3
Chicken pox		4		350	449	103	155	48	151	1,260
Diphtheria		5	3	119	18	8	3	2	5	163
Dysentery				22						22
Erysipelas				8	4	7	1	5	10	35
Influenza					13	3			7	23
Lethargic encephalitis				1		1				2
Measles			8	344	405	112	279	96	134	1,378
Mumps		15	4		176	23	21	19	68	326
Paratyphoid fever					3	2				5
Pneumonia					21		5		12	38
Poliomyelitis				12	29	65	8		3	117
Scarlet fever		14	10	224	267	164	63	184	62	988
Trachoma									1	1
Tuberculosis	3	33	23	93	104	55	1	2	54	368
Typhoid fever	2		8	48	19	5	4	1	10	97
Undulant fever				3	1		1			5
Whooping cough		6		208	324	7	51	11	43	650

CHILE

Typhus fever—January–August 1936.—The following table shows the number of deaths from typhus fever, with rates per 100,000 inhabitants, in Chile for the period January to August 1936, inclusive:

Month	Deaths	Deaths per 100,000 inhabitants	Month	Deaths	Deaths per 100,000 inhabitants
January	77	20	May	46	12
February	65	18	June	37	10
March	62	16	July	44	11
April	29	8	August	61	16

JAMAICA

Communicable diseases - 4 weeks ended October 31, 1936.- During the 4 weeks ended October 31, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy	1	1
Chicken pox		19	Puerperal fever		1
Diphtheria		1	Tuberculosis	41	79
Dysentery	6	2	Typhoid fever	9	64
Erysipelas	1	2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	Week ended— August 1936: 1	8	15	22	29	September 1936: 5	12	19	26	October 1936: 3	10	17	24
Afghanistan	C															P		
Ceylon:																		
Batticaloa	C															3		
Provinces	C	18																
India	C	24,028	21,278	15,291	17,917	5,318	4,339	4,857	5,544	5,915	5,675	5,206						
	D	11,745	10,634	7,672	8,500	2,710	2,283	2,295	2,596	2,797	2,810	2,555						
Assam	C	137	569	262	151	57	42	93	65	36	87	76	82	44	89	59	109	62
	D	65	292	152	75	65	30	33	22	30	46	47	30	35	38	38	59	29
Bassein	C		9	12	1				1									
Bombay Presidency	C	145	365	592	1,923	694	590	761	718	834	693	841	751	685	752	897		
	D	42	123	224	795	313	230	307	320	330	345	395	325	313	327	357		
Bombay	C			[1] 1	[1] 1							[2] 1				[1] 1		
Calcutta	C	799	1,012	580	154	24	26	23	18	12	14	16	13	11	13	11	10	9
Central Provinces and Berar	C	357	715	971	1,349	763	785	1,214	1,591	1,377	1,584		1,683	1,096	1,174	1,101	918	677
Chittagong	C		6	13	5	2		[1] 1			1	4		1			1	1
Madras Presidency	C	1,677	1,556	2,064	3,654	1,284	1,283		1,411	1,520	1,341	1,111						
	D	758	787	902	1,621	610	593		668	716	678	560						
Madras	C	5	2		6						4	2	1	1	1	8	3	9
	D	1			1	1							1			1	2	3
Moulmein	C	2	3	1														
Negapatam	C	2		13	15	5	4	3	6	6	3	1	4	1				
	D			9	7		1	2	4	3	1	1	1	2				
Punjab	C	6	61	231	418	195	115	188	88	66	91	47	18	13	10	1		
Rangoon	C	4		2	3	1	1	1								1		1
Sind State	C					10	3		1	6	19	19						
Tuticorin	C				20													
India (French):																		
Chandernagor Territory	C	6	2	7	8													
Karikal Province	C	4		8	117	32	32		13	21			25		45			
Pondichery Province	C	7	16	4	1			1					4					

[1] Imported.

[2] Suspected.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths, P, present]

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	Week ended— August 1936: 1	8	15	22	29	September 1936: 5	12	19	26	October 1936: 3	10	17	24
Indochina (see also table below):																		
Bentre	C		1															
Pnom-Penh	C		1															
Siam:																		
Bangkok	C	59	52	36	22			1										
Provinces	C	649	288	34	66	15	9	32	28	33	20	7	16	14	8			3
On vessels:																		
S. S. *Kutsang* at Penang from Calcutta	C	1																
S. S. *Karagola* at Penang from Calcutta	C		1															
S. S. *Ekma* at Rangoon from Calcutta	C			1														
S. S. *Chakdina* at Calcutta from Chittagong	C				1													

Place		May 1936: 1–10	11–20	21–31	June 1936: 1–10	11–20	21–30	July 1936: 1–10	11–20	21–31	August 1936: 1–10	11–20	21–31	September 1936: 1–10	11–20	21–31
Indochina (French) (see also table above):																
Cambodia [1]	C		3	1	1		1		2					2	2	
	D		2	1	1		1		2					2	1	
Cochinchina [1]	C	1	1	1		4	1	3	3	1				1		
	D	1	1	1		4		3	3	1				1		

[1] Reports incomplete.

PLAGUE

Place		Mar. 29-Apr. 25, 1936	Apr. 26-May 30, 1936	May 31-June 27, 1936	June 28-July 25, 1936	Week ended— August 1936: 1	8	15	22	29	September 1936: 5	12	19	26	October 1936: 3	10	17	24
Algeria:																		
Bone	C	[2] 3																
Oran Department	C								[2] 1		[2] 1		[2] 1					
Philippeville	C								[2] 1									
Argentina. (See table below.)																		
Azores. (See table below.)																		[2] 2
Belgian Congo	C		1															
Brazil (see also table below):																		
Santos	C						2	1	1									
	D						1											
Sao Paulo.[3]																		
British East Africa:																		
Kenya	C	11	42	39	13	10	2	6	3	4	7	1	4	2	5		4	
Tanganyika	C		3															
Uganda	C	57	153	76	96	18	13	30	19	17	18	17	33	19	15	21	17	
	D	55	148	73	93	17	12	28	19	15	17	17	26	18	15		17	
Ceylon:																		
Colombo	C	3	3	3	3				1					1				1
	D	3	3	3	3									1				
Plague-infected rats		8	8	2	2	1					1						1	3
Hatton	C		3															
Manar	C	1																
Maskeliya	C				1													
Southern Province	C								1									
Weligama	C	1																
China: Manchuria.[4]																		
Dutch East Indies: West Java	C	604	553	363	318	90												
	D	602	550	362	317	90												
Ecuador:																		
Alausi	C											1						
Bajada del Morro	C																[5] 3	
Guayaquil	C	1				2	1			1	1			1				2
	D	1						1			1		1	1				1
Plague-infected rats				3	5	1	1	1	1		1	4	1		1		1	1

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] A report dated July 29, 1936, states that 23 cases of pneumonic plague with 18 deaths were reported in Sao Paulo, Brazil.
[4] A report dated Aug. 20, 1936, states that 5 cases of plague were reported at Kirin Province, Manchuria, China.
[5] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	Week ended— August 1936: 1	8	15	22	29	September 1936: 5	12	19	26	October 1936: 3	10	17	24
Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P		P		P		P		P		P		P	
Asyut Province	C	18	2	2								3		1				
Beheira Province	C														1			
Girga Province	C	1	1															
Minya Province	C	1	1															
Suez	C			1														
France: Marseille [6]	C							1			1	1						
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district: [7]																		
Hamakua Mill sector [7]																1		
Paauhau sect [7]			2		3		1	2		3		7	10	5	6	1		3
Pohakea sector		4																
Maui Island—Wailuku District—Keahua Region																		1
India	C	2,334	626	139	294	174	163	162	187	214	298	259						
	D	1,225	406	92	186	104	87	118	119	103	143	106						
Bassein	C	5	5	2	9		3	2										
Plague-infected rats							1					1						1
Bombay Presidency	C	68	11	4	3	1	1	6	1	1	4	14	29	25	17	12	36	
	D	47	6	2	2		1	3	2		2	6	17	20	17	6	5	
Bombay	C			1														
Calcutta	C				[2] 1													
Central Provinces and Berar	C	487	52		9	1	27	15	38	66	104		29	256	359	324	120	297
Madras Presidency	C	20	6		41	47	52		30	25	32	21					3	
	D	13	2		24	21	31		20	11	26	19					3	
Punjab	C	95	72															
	D	53	47															
Rangoon	C		5	2	2	1	1			1							1	
Plague-infected rats			1		1	2	1	1					1	2				
Indochina (see also table below):																		
Longxuyen	C			1														
Pnom-Penh	C		1			1	2	1										
Saigon-Cholon	C	1																
Tanghai	C	2	4															

Madagascar. (See table below.)																		
Malta	C	3	1	3		1	2			1			1	2	[3] 2			1
	D	2		1		1												
Peru. (See table below.)																		
Senegal. (See table below.)																		
South-West Africa. (See table below.)																		
Tunisia: Tunis	C								1	1					2	2	1	
Plague-infected rats		2		1	1	1			1									
Union of South Africa	C	[8] 6	6	32	[8] 1	[8] 1		[8] 3				6						
United States:																		
California:																		
Lassen County—Plague-infected squirrels				5	1													
Modoc County [9]—Plague-infected squirrels				13	4	10												
Monterey County [9]	C			1														
Placer County [9]	C				1													
San Bernardino County.[9]																		
Santa Cruz County [9]—Plague-infected squirrels				50	11													
Santa Rosa	C	1																
Ventura County—Plague-infected squirrels		1		P														
Idaho: Bonneville County—Plague-infected squirrels				7														
Montana: Beaverhead County.[10]																		
Nevada: Elko County—Plague-infected squirrels			P															
Utah:																		
Beaver County	C				1													
Plague-infected marmots						1	1											
Plague-infected squirrels					1													
Garfield County [11]—Plague-infected prairie dogs							2											
Sevier County.[11]																		
On vessels:																		
S. S. *Ipanema* at Marseille from Bone and Philippeville	C							1										
S. S. *Delambre* at Liverpool from Montevideo, Buenos Aires, Rosario, Santos, and Las Palmas—Plague-infected rats											2							

[3] Suspected.
[6] A report dated Sept 3, 1936, states that 2 plague-infected rats were reported in Marseille, France.
[7] Plague-infected rats have been reported in Hawaii Territory, Hawaii Island, Hamakua District, as follows: Week ended Aug. 8, 2 plague-infected rats, no location given; week ended Oct. 31, 1 plague-infected rat in Hamakua Mill sector; week ended Oct. 31, 2 plague-infected rats, and week ended Nov. 7, 1 plague-infected rat, in Paauhau sector.
[8] For 2 weeks.
[9] Plague-infected fleas have been reported in California as follows: Week ended June 27, 1936, 3 lots in Modoc County, and 7 lots in Santa Cruz County; Aug. 18–21, 104 plague-infected fleas collected from ground squirrels in San Bernardino County, and according to information dated Nov. 10, 31 fleas taken from 24 Fisher squirrels shot in Holcomb Valley, also in San Bernardino County have been proved positive for plague. A report dated Oct. 13, 1936, states that fleas taken from ground squirrels in Monterey County and from chipmunks and ground squirrels in Placer County have been proved plague infected.
[10] During the week ended July 25, 1936, 153 fleas and 26 lice taken from 7 marmots (ground hogs) shot at the head of Small Horn Canyon, Beaverhead County, Mont., were reported plague infected.
[11] Plague-infected fleas in Utah have also been reported as follows: Aug. 24, 45 fleas taken from 23 prairie dogs in Garfield County, and July 28, 1936, 315 fleas taken from 11 ground squirrels in Clear Creek Canyon, Sevier County.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	Week ended— August 1936: 1	8	15	22	29	September 1936: 5	12	19	26	October 1936: 3	10	17	24
Finland	C				6	6	1			1								
France. (See table below.)																		
Gambia (Upper)	C				38													
Gold Coast	C				[8] 12													
Great Britain: England and Wales—London and Great Towns	C		4															
Greece: Salonika	C	20	37	34	13													
Guatemala. (See table below.)																		
India	C	34,748	36,861	16,397	10,011	1,465	1,104	824	936	1,090	935	934						
	D	9,091	9,916	4,696	2,955	394	248	256	311	269	239	262						
Assam	C	219	270	95	54	14	17	14	14	20	24	19	17	10	13	24	11	4
Bombay Presidency	C	2,859	2,747	962	647	152	74	126	73	85	68	71	78	41	52	62	28	
	D	560	581	192	128	22	20	29	18	11	8	14	14	10	11	14	9	
Bombay	C	322	237	99	46	13	6	10	7	3	2	2	9	4		6	3	1
	D	195	155	68	28	8	4	10	3	3	2	2	7	3		4	1	1
Calcutta	C	1,552	567	275	46	5	13	7	11	9	4		2		2	6		1
	D	1,166	466	168	38	7	8	7	8	9	4	1	3		2	4		1
Central Provinces and Berar	C	2,826	3,043	1,100	477	63	50	33	18	23	42		15	13	13	6	3	17
Chittagong	D	1		3	11										1			
Cochin	C											2						
Karachi	C	36	19	5	2													
Madras Presidency	C	1,236	1,225	796	752	217	249	206	221	229	134	141		73			24	
	D	214	215	137	160	44	41	42	33	40	22	31		17			11	
Madras	C	1	5			1				1		1	2					1
Moulmein	C	35	35	21	15	2	3	4	1		4	7	1			2	1	
Negapatam	C	3	1															
Northwest Frontier Province	C	21	11	16	15					7		7	15		4	1	1	5
Punjab	C	372	377	320	113	9	14	8	4	17	19	3	3	40	9	4		
Rangoon	C	30	4	7	1	2		2		[4] 1				1	2	2		5
Sind State	C	90	349	194	54	10	10	1	4	6	19	19	5	8	1	7	7	6
Vizagapatam	C	2	5	2		1			1						1			
India (French):																		
Chandernagor Territory	C	29	10	8														
Karikal Province	C	2																
Pondichery Province	C	2	2		6		1											
	D	2	1		2													

Indochina (see also table below):																		
Pnom-Penh	C			1	1		1				1		5	1		2	1	1
Saigon	C	1																
Tourane	C	1	1															
Iran	C			7	1	4				2	5	4						
Teheran	C				1		2			1	1		3			2		
Iraq	C	10	11	1			1								3			
Baghdad	C	2	1				1											
Basra	C	3																
Japan:																		
Kobe	C	1																
Nagasaki	C	1																
Osaka	C		1	1	2		2	1	3	5	8	4	4	5	2	1	1	
Yokohama	C		1															
Mexico (see also table below):																		
Chihuahua	C	2	2	2														
Guadalajara	D	33	21	6	3	1	1					1						
Mexico, D. F	C	20	23	15	7	6		1										
Monterrey	C	1																
Torreon	C				3													
Morocco. (See table below.)													2	1	8	1	1	1
Mozambique. (See table below.)																		
Nigeria	C	509	427	1,028	[3] 512		[1] 32		2									
Lagos	C							1						1	1			
Nyasaland. (See table below.)																		
Peru. (See table below.)																		
Portugal (see also table below):																		
Lisbon	C	3	1		2	1	1							1				
Oporto	C			1		1							1					
Salvador. (See table below.)																		
Saudi Arabia	C	12	6															
Sierra Leone	C	9	9	25	9	[1] 1		[1] 2						[1] 38				
Freetown	C	[1] 1	2															
Spain	C	24	12	23														
Straits Settlements: Singapore	C			[4] 1														
Sudan (Anglo-Egyptian)	C	6	17	5	1		12	1					[5] 100	1	30	6		
Turkey. (See table below.)																		
Union of South Africa	C				1	P												

[1] For 2 weeks.
[3] For 4 weeks.
[4] Imported.
[5] For 5 weeks.

On vessels:

S. S. *Hokuryo Maru* at Moji from Tientsin	1 case	Apr. 2, 1936
S. S. *City of Adelaide* at Colachel from Rangoon	1 case	Apr. 13, 1936
S. S. *Egra* at Rangoon from Calcutta	1 case	Apr. 13, 1936
S. S. *City of London* at Suez from Calcutta	1 case	Apr. 20, 1936
S. S. *Manipura* at Port Sudan from Calcutta	1 case	Apr. 23, 1936
S. S. *Kasagi Maru* at Moji from Shanghai	1 case	May 4, 1936

On vessels—Continued.

S. S. *Awaji Maru* at Nagasaki from Dairen	1 case	May 8, 1936
S. S. *Bhutan* at Kobe from Shanghai	8 cases	May 13, 1936
S. S. *Jinkai Maru* at Moji from Hongay	1 case	June 1, 1936
S. S. *Rohna* at Penang from Madras	1 case	June 11, 1936
S. S. *Maya Maru* at Moji from Shanghai	2 cases	June 18, 1936
S. S. *Talamba* at Rangoon from Calcutta	1 case	Aug. 11, 1936

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		April 1936	May 1936	June 1936	July 1936	August 1936	September 1936
Angola	C	29					
Argentina:							
Buenos Aires Province	C	7	12				
Chaco Territory	C					1	
Corrientes Province	C					6	3
Jujuy Province	C	3	3	9	6	1	
Santa Fe Province	C						2
Belgian Congo	C	135	75	188	98	88	
Bolivia	C	18	31	8	29	12	
China: Manchuria—Harbin	C		7				
Chosen	C	313	183	84	21	10	
Colombia (see also table above):							
Barranquilla	D			1			
France	C				36	2	
Guatemala	C	5	1	3	5	13	1
Indochina (see also table above)	C	221	112	78	93	119	87
	D	30	19	10	8	21	8
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	4	2				
Mexico—Continued.							
Chihuahua State—Chihuahua	C					1	
Jalisco State—Guadalajara	C	30	37			3	
	D	34	26			1	
Lower California	C		1				
Mexico State	C	6	4				
Mexico, D. F.	C	13			12	5	
Mexico City	C		28				
Puebla State—Puebla	C	1	2				
Queretaro State	C				1		
Sonora State	C	1					
Morocco	C	15	6	3	3	2	1
Mozambique	C	5					
Nyasaland	C	3					
Peru	C	30	10		7		
Portugal (see also table above)	C	16	24	39			
	D		2	8			
Salvador	C	30	48				
Turkey	C	1	16		16		

TYPHUS FEVER

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936				August 1936					September 1936				October 1936		
					4	11	18	25	1	8	15	22	29	5	12	19	26	3	10	17
Algeria:																				
Algiers Department	C	77	80	85	12	16	24	21	2	4	10	8								
Algiers	C		4	3			1			1										1
Constantine Department	C	62	61	24	9	22	5	8	30		2	8	2			1		1	1	
Bone	C		1																	
Constantine	C		2	1			2					2					1			
Philippeville	C			1																
Oran Department	C	32	12	8	1						1	1								1
Australia: Sydney	C		1																	
Basutoland	C		18			[1] 5								[2] 7						
Bolivia. (See table below.)																				
Bulgaria	C	47										1								
Chile	C		199	248					[3] 265			[4] 243								
Valparaiso	C	12	2	4	1	1		1			1	1	1	1						
China:																				
Hankow	C	3	2	5	1															
Nanking	C	1			1															
Shanghai	C		3	7											2					
Tientsin	C	1	4	4	5	1			1											
Tsingtao	C		1			1						1	1							
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	1	1		1	1					1	1							2	
Aswan Province	C															1				
Asyut Province	C	1	2				2			3	1									
Beheira Province	C	49	28	35			8			1										
Cairo	C	6	8	1	1	1	1			1								1	1	2
Dakahliya Province	C	6	15	9			1													
Faiyum Province	C						1													
Gharbiya Province	C	33	32	27		5				3										
Girga Province	C	1				1					2									
Minufiya Province	C		2	2		1				2										
Port Said	C		1																	

[1] For 2 weeks. [2] For 6 weeks. [3] For 5 weeks. [4] For 3 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936 4	11	18	25	August 1936 1	8	15	22	29	September 1936 5	12	19	26	October 1936 3	10	17
Egypt—Continued.																				
Qena Province	C	20	1																	
Sharkiya Province	C		2				7			3	1									
Suez	C			1						1										
Provinces	C	563	521	336	80	21	20	14	8	14	5	2	1		3	1	1	2	3	1
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	4	5	4	1					1	1	1	1	1	1	1	1	1		
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C		1			1	1	1		1		1	1	4		2	1	4	2	4
Hungary	C	4	1											1						
Iran	C	25	21	17	8				4					2		6	3			3
Teheran	C	11					1										2			
Iraq	C			1																
Irish Free State:																				
Galway County:																				
Bothar Buidhe	C			1		1														
Oughterard	C					1	1													
Kerry County—Dingle	C												2	1	2				2	
Mayo County	C	2	1																	
Lithuania	C	10	4	11																
Mexico (see also table below):																				
Durango	D									1										
Mexico, D. F.	C	44	33	13	3	4	7		4	1	7	6	2	6	7	6	4		4	
Saltillo	D																			1
San Luis Potosi	D			1				1												
Torreon	C			1		1									1					
Morocco (see also table below)	C	39	28	7	2	4				1										
Palestine:																				
Haifa	C	1	8	13	12	1	1	2	4	1	3	2	3	1	4	5	6		3	2
Jaffa	C							5			5	2	6	5	3	7	5	4	3	3
Panama Canal Zone. (See table below.)																				
Paraguay: Asuncion	D								1	1		1								
Peru. (See table below.)																				
Poland	C	519	587	252	51	44	27	14	22	10	3	5	9	6	11	4	26	16	9	13
	D	29	35	15	1	3	4	8												

Portugal. (See table below.)																				
Rumania. (See table below.)																				
Spain: Catalonia	C				1															
Straits Settlements: Singapore	C	1				2		1							2		1			
Trans-Jordan	C	10																		
Tunisia:																				
Tunis	C	4	3	3			1	1		1				2						1
Provinces	C	127	114	49	7	17	7	9	7	11			3	10	3		6	7	12	3
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Rotterdam from Algiers	C		1																	

Place		April 1936	May 1936	June 1936	July 1936	August 1936	September 1936
Bolivia	C	75	38	46	47	29	
China: Manchuria—Harbin	C		33	29	15	3	
Chosen	C	312	225		80	20	
Czechoslovakia	C	99	49	23	4	1	
Finland	C	112	10			1	1
Greece (see also table above)	C	5	3	4	3	10	9
Guatemala	C	114	116	59	30	30	38
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	5	5			3	
Durango State	D					1	
Guanajuato State	C	2				7	
Jalisco State: Guadalajara	C				1	1	
Mexico State	C	6	6		3	10	
	D		2		2	2	
Mexico, D. F.	C	40			23	19	
Mexico City	C	20	26				
	D		15				8
Oaxaca State	C					4	

Place		April 1936	May 1936	June 1936	July 1936	August 1936	September 1936
Mexico—Continued.							
Puebla State: Puebla	C	3	3			10	
Queretaro State	C		1			1	
San Luis Potosi State: San Luis Potosi	C	3	3		3	4	
Sinaloa State	D				1		
Morocco (see also table above)	C	45	26	9	6	2	
Panama Canal Zone	C			2			
Peru	C	103	81		268		
Portugal	C	1		1			
Rumania	C	1,587	1,143	427	168	32	
Turkey	C	79	39	25	39	15	
Istanbul	C	1	1	1	2	1	1
Union of South Africa:							
Cape Province	C	48	71	60	58		
Natal	C	1	2	1			
Orange Free State	C	18	10	24	2		
Transvaal	C	3		1			
Yugoslavia	C	106	125	78	58	16	6

[1] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 29–Apr. 25, 1936	Apr. 26–May 30, 1936	May 31–June 27, 1936	Week ended— July 1936 4	11	18	25	August 1936 1	8	15	22	29	September 1936 5	12	19	26	October 1936 3	10	17
Bolivia: Santa Cruz Department.[1]																				
Brazil:[2]																				
Amazonas State	C		3																	
Maranhão State	C		1																	
Matto Grosso State	C	2		1																
Minas Geraes State	C	2	5	1																
	D	2	5	1																
Paraná State	C	3																		
São Paulo State[3]	C	[3]3	16	6																
Colombia	D											2	1			3				
Boyaca Department.[4]																				
Cundinamarca Department	D				1		1		1											
Intendencia of Meta—																				
Restrepo[4]	D				1			1		1	1									
Villavicencio[4]	D															1				
Santander Department[4]	D						1		1	3										
Dahomey	C					[5]1										[5]1	1			
French Guinea—Macenta	C														1	[5]1			1	
Gold Coast:																				
Koforidua	C	1																		
Peprawase	C	1																		
Ivory Coast: Vavua	C	1																		
Nigeria:																				
Aba	C															[5]1				
Calabar.[6]																				
Ilorin Province	D																[5]1			
Kano	C											[5]1								
Niger Territory: Fada N'Gourma	C	1																		
Senegal:																				
Khombole.[7]																				
Thies	C			1																
Tivaouane	C			2											1					
Sierra Leone	C																[5]1			[5]1

Sudan (French):																				
Katibougou	C	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	1	------
Kayes	C	------	------	------	[5] 1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Koulikoro	C	------	------	------	------	------	------	------	------	------	------	------	------	------	------	1	------	------	[5] 2	------
Segou.[8]																				

[1] Yellow fever has been reported in Santa Cruz Department, Bolivia, as follows: For the months of April, 1 case; May, 1 case; June, 2 cases.

[2] Yellow fever has also been reported in Brazil as follows: São Paulo State, no date given, 3 cases and 4 deaths. Mar. 24-31, 1936, 2 cases, 2 deaths.

[3] Includes 1 case of yellow fever reported in the city of São Paulo, Brazil.

[4] Yellow fever has also been reported in Colombia as follows: Boyaca Department, Jan. 4 to May 15, 9 deaths; Restrepo, June 4 to July 26, 6 deaths; Villavicencio, January, June, and July, 6 deaths; Santander Department, June and July, 6 deaths.

[5] Suspected.

[6] During the week ended Nov. 14, 1936, 1 suspected case of yellow fever was reported in Calabar, Nigeria.

[7] During the week ended Oct. 31, 1936, 1 case of yellow fever was reported in Khombole, Senegal.

[8] During the week ended Oct. 31, 1936, 1 case of yellow fever was reported in Segou, French Sudan.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 51 DECEMBER 4, 1936 NO. 49

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE SECOND QUARTER AND THE FIRST HALF OF 1936 [1]

By DEAN K. BRUNDAGE, *Senior Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

The data upon which this report is based were obtained from establishments in various sections of the United States, the greater percentage of them being located north of the Ohio and Potomac Rivers and east of the Mississippi.

The sickness rates for the second quarter and the first half of the years 1935 and 1936 were derived from analyses of reports from a group of 28 identical sick-benefit organizations. The rates for the first half of the years 1931–35 include 24 of those companies.

The rise in sickness incidence which was recorded for a group of approximately 154,000 male industrial employees in the first quarter of 1936 extended into the second quarter of the year. During the 6 months, January to June, inclusive, of 1936 as compared with the corresponding period of former years, the frequency of illness causing disability for 8 calendar days or longer reached 100 cases per 1,000 male industrial workers for the first time since 1932.

For all respiratory diseases the rate for the second quarter of 1936 was 1.9 per 1,000 employees higher than the rate for the corresponding 3 months of 1935, due to an increase in the number of cases reported as bronchitis (acute and chronic), influenza, and pneumonia (all forms). With the exception of the diseases of the pharynx and tonsils and tuberculosis of the respiratory system, every subgroup in the category of respiratory disease showed higher rates for the first 6 months of 1936 than for the corresponding period of 1935.

The favorable downward trend in the frequency of new cases of tuberculosis of the respiratory system (as shown in the table) as well as the lower death rate among the 17,000,000 industrial policyholders of the Metropolitan Life Insurance Co.[2] continued throughout the second quarter of 1936.

As in the first quarter of 1936, the incidence rate of cases of pneumonia in the second quarter of 1936 exceeded the corresponding

[1] The report for the first quarter of 1936 was published in the Public Health Reports for July 24, 1936, vol 51, no 30, pp 989–991

[2] Statistical Bulletin, Metropolitan Life Insurance Co, vol 17, no 7, July 1936, p 11

quarter of the preceding year. Indeed, 3.8 cases per 1,000 males for January–June of 1936 is the highest rate recorded for any first half-year period since 1929. As stated in a former report,[3] this is suggestive of correlation between pneumonia frequency and the rate of industrial activity.

The increase in the incidence rate of all nonrespiratory diseases for the second quarter of 1936 as compared with the second quarter of 1935 was negligible; it amounted to only 0.4, while for the entire first half of 1936 the increase was 1.7 when compared with the same period of 1935. The incidence rates for the first 6 months of 1936 and the average for the first half of the years 1931-35 are approximately the same.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the second quarter of 1936 compared with the same quarter of 1935, and in the first half of 1936 as compared with corresponding period of preceding years. (Male morbidity experience of industrial companies which reported cases to the U. S. Public Health Service)* [1]

Diseases and disease groups which caused disability. (Numbers in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929)	Annual number of disabilities per 1,000 men				
	Second quarter of—		First half of—		
	1936	1935	1936	1935	1931–35
Sickness and nonindustrial injuries [2]	86.9	84.0	100.2	93.9	98.8
Nonindustrial injuries	10.2	9.6	10.8	9.9	10.8
Sickness [2]	76.7	74.4	89.4	84.0	88.0
Respiratory diseases	29.8	27.4	41.6	37.9	40.1
Bronchitis, acute and chronic (106)	4.7	3.6	6.0	4.2	4.0
Diseases of the pharynx and tonsils (115a)	5.1	6.5	5.8	5.9	5.6
Influenza and grippe (11)	12.3	10.0	20.6	18.8	22.3
Pneumonia, all forms (107–109)	2.6	2.2	3.8	3.0	2.6
Tuberculosis of the respiratory system (23)	.7	1.1	.7	1.1	1.0
Other respiratory diseases (104, 105, 110–114)	3.9	4.0	5.2	4.9	4.6
Nonrespiratory diseases	47.4	47.0	47.8	46.1	47.9
Disease of stomach, cancer excepted (117–118)	4.1	3.5	3.8	3.6	3.7
Diarrhea and enteritis (120)	1.0	.9	1.1	1.0	1.0
Appendicitis (121)	4.6	4.1	4.3	3.8	3.7
Hernia (122a)	1.6	1.7	1.7	1.5	1.6
Other digestive diseases (115b, 116, 122b-129)	2.9	2.9	2.9	2.9	3.0
Rheumatic group, total	10.6	9.8	10.4	10.1	11.2
Rheumatism, acute and chronic (56, 57)	5.0	4.5	4.7	4.6	5.7
Disease of organs of locomotion (156b)	3.2	2.6	3.3	2.8	3.2
Neuralgia, neuritis, sciatica (87a)	2.4	2.7	2.4	2.7	2.3
Neurasthenia and the like (part of 87b)	1.2	1.5	1.0	1.2	1.2
Other diseases of nervous system (78-85, part of 87b)	1.2	1.5	1.2	1.3	1.4
Diseases of the heart and arteries, and nephritis (90–99, 102, 130–132)	3.4	3.8	3.9	4.1	4.2
Other genito-urinary diseases (133–138)	2.2	2.8	2.4	2.7	2.4
Diseases of the skin (151–153)	2.3	2.2	2.4	2.3	2.5
Infectious and parasitic diseases (1–10, 12–22, 24–33, 36–44)	3.0	3.6	3.3	3.1	3.0
Ill-defined and unknown causes (200)	2.8	2.2	2.6	2.1	1.9
All other diseases (45–55, 58–77, 88, 89, 100, 101, 103, 154–156a, 157, 162)	6.5	6.5	6.8	6.4	7.1
Average number of males covered in the record	153,670	138,214	149,901	138,080	145,356
Number of companies included	28	28	28	28	

[1] In 1935 and 1936 the same companies are included. The rates for the first half of the years 1931-35 include 24 of these companies, which employed an average of 114,961 men during these months, or 79 percent of the 145,356 men representing the sample population for the 5 years.

[2] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.

[3] See footnote 1.

The most marked increase in disorders of the digestive system both for the second quarter and the first half year of 1936 occurred in the diseases of the stomach (cancer excepted) and appendicitis. The incidence rate for appendicitis during the first 6 months of 1936 was 4.3 per 1,000 employees as compared with 3.8 for the same period of the preceding year, and with an average of 3.7 for the years 1931–35 inclusive. However, mortality from appendicitis according to the records of the Metropolitan Life Insurance Co.[4] was lower during the first 6 months of 1936 (10.7 per 100,000 policyholders) than during the same months of 1935 and 1934 (11.7 and 12.7, respectively). The second quarter reveals, moreover, a higher incidence for the rheumatic group of diseases than was recorded in the 1935 period, namely, 10.6 as against 9.8.

The frequency rates for diarrhea and enteritis, hernia, "other digestive diseases," and diseases of the skin were approximately the same in the second quarters of 1936 and 1935. A small decrease is shown both in the second quarter and the first half of 1936 in the incidence of diseases of the heart, arteries, and nephritis and in "other diseases of the genito-urinary system."

The records show an increase of 0.6 and 0.9, respectively, in the frequency of nonindustrial accidents per 1,000 employees in the second quarter and in the first half of 1936 as compared with the corresponding periods of the preceding year.

THE PHYSIOLOGICAL RESPONSE OF PERITONEAL TISSUE TO CERTAIN INDUSTRIAL AND PURE MINERAL DUSTS[1]

By JOHN W. MILLER, *Acting Assistant Surgeon*, and R. R. SAYERS, *Senior Surgeon, United States Public Health Service*

The behavior of certain dusts when introduced into the peritoneal cavity as foreign bodies has been described in previous reports.[2] In 1924, experiments were begun at the Pittsburgh station of the United States Bureau of Mines to determine the action and fate of various dusts when injected into the peritoneal cavity of guinea pigs. The conclusions reached at that time were that live animal tissue in all parts of the body tends to react in essentially the same manner to foreign bodies and that fibrous tissue is formed in the peritoneal cavity by quartz and is not formed by limestone and coal. This paper reports a continuation and elaboration of these earlier studies.

[4] Footnote 2 and ibid., vol. 16, no. 7, July 1935, p. 11.

[1] From the Laboratory of Industrial Hygiene of the Office of Industrial Hygiene and Sanitation.

[2] Miller, J. W., and Sayers, R. R.: The Response of Peritoneal Tissue to Dusts Introduced as Foreign Bodies. Pub. Health Rep., 49:80–89 (Jan. 19, 1934). (Reprint No. 1608.) J. Am. Med. Assoc., 103: 907–912 (Sept. 22, 1934). Am. J. Pub. Health, 25:452–456 (April 1935).

Miller, J. W., and Sayers, R. R.: Microscopic Appearance of Experimentally Produced Dust Nodules in The Peritoneum. Pub. Health Rep., 50:1619–1628 (Nov. 15, 1935). (Reprint No. 1717.)

Owing to the length of time required to obtain a reaction by inhalation methods and the desirability of determining the harmfulness of a dust in a relatively short time, other methods of introducing the dusts to be studied were considered. Injection into the peritoneal cavity seemed to give the most promise, because of the relatively circumscribed area of the cavity, the ease in controlling the amount of the dose, and the preservation of the sterility of the material introduced—a factor to be considered in inhalation and intratracheal methods. Mortality from peritonitis or peritoneal damage following intraperitoneal injection was found to be negligible Identical reactions were found in each animal injected with the same dust under the same conditions and examined at the same time interval after injection. (Animals in groups of from 5 to 20 were used for each set of test conditions.)

The dusts investigated produced distinct types of reaction, which made it possible to classify them into the following three groups: (1) A group in which the dust was absorbed or disappeared without visible gross damage; (2) a group in which the dust initiated cellular proliferation followed by fibrosis and retrograde changes; (3) a group in which the dust remained inert in the tissues, neither being absorbed nor causing gross proliferation. Since the development of this classification on the basis of physiological response, an additional number of industrial and other dusts have been examined and classified. The results are reported in this paper.

PREPARATION OF THE DUSTS FOR INJECTION

It was desirable that the particle size of each dust tested conform as closely as possible to that of the other dusts used, and also be as small as possible without change in the physical or chemical composition. Particles passed through 100-, 200-, and 325-mesh standard sieves were used in one series of tests with several dusts

The 325-mesh size was found to be the most suitable, because of the greater facility with which a reaction is produced. The particles obtained by passing a dust through a 325-mesh sieve were less than 43 microns in size

In later series an air separator was used. This method of elutriation did not separate all the dusts in the series into fractions of the same size; yet it did produce samples less than 10 microns in maximum measurement. The median size of the dusts used in this series varied from 0 45 to 3 25 microns. Such variations in particle size appeared to be of no importance in comparing the physiological responses produced by the dusts. It can be readily seen that the air-separated particles more closely approximate those inhaled under industrial conditions.[4] While the smaller particles were prefera-

[4] Bloomfield, J J The Size Frequency of Industrial Dust Pub Health Rep, 48.961-968 (Aug 11, 1933)

ble, because of their greater assimilation by the cells, the particles that had been passed through a 325-mesh sieve gave the same gross reactions and, in the case of all dusts mentioned in this study, can be used in place of the more difficultly obtained smaller particles. Water separation was not attempted, because of the possibility of removing soluble portions of the dusts and thus producing a change in their chemical composition.

TECHNIQUE OF INTRAPERITONEAL INJECTIONS

A weighed portion of the dust and a few glass beads to facilitate suspension were placed in a small wide-mouthed flask and sterilized in a hot-air oven for 1 hour at 150° C. After cooling, sufficient sterile physiological saline solution to make a 5- or 10-percent suspension was added, the bottle was closed with a sterile rubber stopper, and the whole was thoroughly shaken. Owing to the fact that a suspension of fine dust causes a locking of the plunger of a hypodermic syringe, air-bulb syringes of 3-cc capacity were used. Any small hypodermic syringe, fitted with a rubber bulb in place of the plunger, will serve the purpose. Needles of 21- or 24-gage were found most suitable for the injections. The needles and syringes were sterilized in boiling water before use.

The hair on the right side of the animal's abdominal wall was clipped and tincture of iodine was applied. For injection, 2 cc of the 5- or 10-percent suspension, equivalent to 0.1 or 0.2 gm of dust, was introduced, intraperitoneally, into each pig at the iodine-painted site.

In the early series of experiments, animals were killed at intervals of 7, 14, 30, 56, 90, 112, 180, and 360 days after injection. It has been found that intervals of 14, 30, 60, and 90 days are sufficient to produce a reaction that can be differentiated. In most of the tests a series of animals has been kept for 180 days to confirm the earlier observations. With a great many dusts, classification into one or the other of the three groups can be made in 60 days.

DISTRIBUTION OF THE DUST IN THE PERITONEAL CAVITY

With the exception of bituminous coal, the greater part of each of the dusts in this series was found in the peritoneum of the anterior abdominal wall, the most dependent portion of the peritoneal cavity. The site of the next largest collection was the omentum Small nodules and dispersed collections of particles were also found in the inguinal canals, on the mesentery, liver, intestines, testes or uterus, and diaphragm. A very little was occasionally found on the posterior abdominal wall. In the case of bituminous coal, the greater portion was found in the omentum and mesentery, while a relatively small part was present on the anterior abdominal wall. As a basis of comparison (in describing the reactions caused by the dusts), the nodules

formed on the anterior abdominal wall were used, since they were more accessible and were more constant and uniform in appearance. The response in the omentum or at any other point in the peritoneal cavity was, however, the same as that found on the anterior abdominal wall. Nodules were only infrequently found in the peritoneum at the site of the entrance of the needle—so rarely, in fact, that it was safe to assume that the trauma produced by the introduction of the needle was negligible.

ADHESIONS IN THE PERITONEAL CAVITY

Adhesions between the various abdominal viscera and the anterior abdominal wall or omentum were at first thought to be of some significance. However, it was noted that while the presence of adhesions was more frequent when dusts of a high silica content were used and correspondingly less frequent with such dusts as calcite and limestone, they were not of sufficient constancy to be used to draw any definite conclusions as to the activity of the dust. Adhesions were formed occasionally by calcite and by limestones of a very low silica content. They were likewise present to a marked degree in the animals injected with cement; yet subsequent observations showed that these dusts decreased in amount in the tissues as the tests progressed. It was concluded that the formation of adhesions was a result of the initial foreign body injury caused by the dust in the peritoneal cavity. This injury may be mechanical or it may be the result of a chemical irritation, due to some readily soluble constituent of the dust. The formation of peritoneal adhesions does not appear to be related to the subsequent behavior of the dust but may indicate a violent early reaction in the peritoneum.

THE ABSORPTIVE GROUP OF DUSTS

Dusts of the absorptive group, after being injected into the peritoneal cavity, formed nodules, the gross appearance of which was irregular, more or less discrete, but often clumped. The nodules became progressively smaller in size as the interval between injection and examination increased, and this decrease in size was accompanied by the production of brown pigment particles, which were first noted at the edges of the nodules, and later covered their entire surfaces and diffused into the adjacent peritoneum. This brown pigment, which did not respond to the iron reactions, varied in amount depending on the kind of dust used. The original dust eventually disappeared, leaving a small area of fine, brown pigment particles at the site of the nodule. These, in turn, disappeared without the formation of scar tissue. The speed with which the dust was absorbed and the severity of the initial reaction varied somewhat with the composition of the dusts. Pure calcite, for example, disappeared more rapidly

from the peritoneal tissue than did a relatively pure sample of limestone. The decrease in amount of and the disappearance of the dust from the peritoneum is a well-marked characteristic of this group of dusts.

After 7 days, microscopic examination showed that the nodules consisted almost entirely of large clumps of dust mixed with fine, granular, necrotic material. A narrow, cellular zone, composed principally of fibroblasts, enclosed the mass of dust and necrotic material. A few macrophages were found in this zone, usually adjacent to the dust clump. As the interval between injection and examination increased, capillary buds, accompanied by macrophages and fibroblasts, extended into the dust mass. Fine, brown pigment particles had made their appearance and were engulfed in the cytoplasm of the macrophages, a process that reached its peak of activity about 90 days after injection of the dust. At this time, pigmented connective tissue cells were conspicuous and only a few particles of the original dust remained. After 180 days, and also after 360 days, the nodules consisted exclusively of pigmented connective tissue cells and fat cells, and even these appeared to have decreased in number. The necrosis noted in the early stages had disappeared.

DUSTS CAUSING AN ABSORPTIVE REACTION

Calcite.—A pure mineral dust. Chemical analysis: Acid insoluble matter, 0.0 percent; silica, 0.0 percent. Petrographic examination: A calcite of high purity. Dust used passed through a 325-mesh screen.

Calcite.—A pure mineral dust. Chemical analysis: Acid insoluble matter, 0.1 percent, all of which was silica. Petrographic examination: A calcite of high purity. Median particle size, 1.2 microns. Geometric standard deviation, 1.4 microns.

Precipitated calcium carbonate.—A chemical byproduct. An industrial dust. Chemical analysis: Silica, 0.4 percent; calcium carbonate, 87.9 percent; magnesium carbonate, 10.1 percent; magnesium oxide, 0.1 percent; iron and aluminum oxides, 0.6 percent. Petrographic examination: Precipitated calcium carbonate, about 98 percent; crystals, probably sodium carbonate, about 2 percent. Median particle size, 1.05 microns. Geometric standard deviation, 1.4 microns.

Limestone.—An industrial dust. Chemical analysis: Silica, 1.5 percent; calcium oxide, 54.4 percent; magnesium oxide, 0.4 percent; iron and aluminum oxides, 0.4 percent. Petrographic examination: Irregularly rounded calcite. No impurities noted. Median particle size, 0.95 micron. Geometric standard deviation, 1.6 microns.

Limestone.—An industrial dust. Chemical analysis: Silica, 2.73 percent; calcium carbonate, 95.21 percent; magnesium carbonate,

1.17 percent. Petrographic examination: A dolomitic limestone; no impurities observed. Median particle size, 2.35 microns. Geometric standard deviation, 1.8 microns.

Limestone.—An industrial dust. Chemical analysis: Acid insoluble matter, 7.2 percent; silica 5 percent. Petrographic examination: Only an infrequent quartz crystal was noted. A high calcium carbonate content. Dust used passed through a 325-mesh screen.

Gypsum.—The uncalcined, natural mineral. An industrial dust. Chemical analysis: Silica, 1.3 percent; calcium sulphate, 97.1 percent. Petrographic examination: Gypsum, about 70 percent; calcite, about 30 percent. Median particle size, 1.1 microns. Geometric standard deviation, 1.5 microns.

Portland cement.—An industrial dust. Chemical analysis: Silica, 21.1 percent; calcium oxide, 74.4 percent; magnesium oxide, 2.8 percent. Petrographic examination: Normal portland cement. Median particle size, 0.65 micron. Geometric standard deviation, 1.4 microns.

THE PROLIFERATIVE GROUP

The dusts of this group, after an initial stage of foreign body irritation, manifested by edema and congestion about the collections of dust in the peritoneum, produced nodules that progressively increased in size. These nodules, when occurring in clumps, fused together, forming a large single mass. Numerous capillaries were present on the surfaces and throughout the nodules. The appearance was that of cellular proliferation and was apparently due to the chemical irritation supplied by the solution of the silica in the tissues. The maximum size of the nodules was observed 90 days after injection. After this period they became more firm, contracted, and fibrous in appearance. At the end of 360 days this induration was quite marked. The rate of development and the size of these nodules varied with the composition of the dust. Pure free silica produced the most rapid response. The presence of certain inert constituents, such as limonite or clay, produced variations, not only in the rate of development, but also in the color of the nodules. Any progressive increase in the size of the nodules up to a period of 90 days after injection can be designated as a proliferative reaction.

Seven days after injection, microscopic examination of the nodules showed a central mass of dust particles, mixed with, and surrounded by, a fairly wide zone of fine, granular necrotic material. The cellular elements were most conspicuous at the periphery and base of the nodules. The cellular portion was composed of many fibroclasts in various stages of development and a few scattered macrophages containing engulfed dust particles. The fibroblasts were arranged in concentric whorls and interlacing bundles, and those adjacent to the dust mass assumed a layer-like arrangement, forming an apparent

inner capsule. The fibroblast was the predominant type of cell. Capillaries occurred in large numbers in the cellular portion of the nodule. As the duration of the tests increased, the macrophages became more numerous and many were filled with dust particles. This increase was most marked in the 30-day tests. After 90 days, fibroblasts and adult connective tissue cells were again predominant, occurring in about equal numbers, although numerous dust-bearing macrophages were still present. The necrotic material appeared to decrease progressively in amount from the seventh to the sixtieth day, but at 90 days an increase was noted. Areas of early calcification were present in the centers of the necrotic material. In the 180-day nodules, the cellular portion consisted of fibrous tissue cells, fat cells, and a few fibroblasts. The areas of necrosis and calcification were larger These retrograde changes had advanced markedly in 360 days with calcification being the most prominent feature of the nodule

DUSTS CAUSING A PROLIFERATIVE REACTION

Quartz.—A pure mineral dust. Chemical analysis: Silica, 99.4 percent. Petrographic analysis: Normal crystalline quartz of high purity. Median particle size, 1.30 microns. Geometric standard deviation, 1.8 microns.

Quartz.—A pure mineral dust. Chemical analysis: Silica, 99.3 percent. Petrographic examination: Normal crystalline quartz of high purity. Dust passed through a 325-mesh screen.

Quartz.—An industrial dust. Chemical analysis: Silica, 99.1 percent. Petrographic examination: Normal quartz. Median particle size, 1.25 microns. Geometric standard deviation, 1.8 microns.

Tripoli.—An industrial dust. Chemical analysis: Total silica, 98.9 percent; calcium oxide, 0.2 percent; magnesium oxide, 0.1 percent; iron and aluminum oxides, 0.3 percent. Petrographic examination: Chalcedonic silica (crystalline aggregates) with an occasional crystal of normal quartz. Dust passed through a 325-mesh screen.

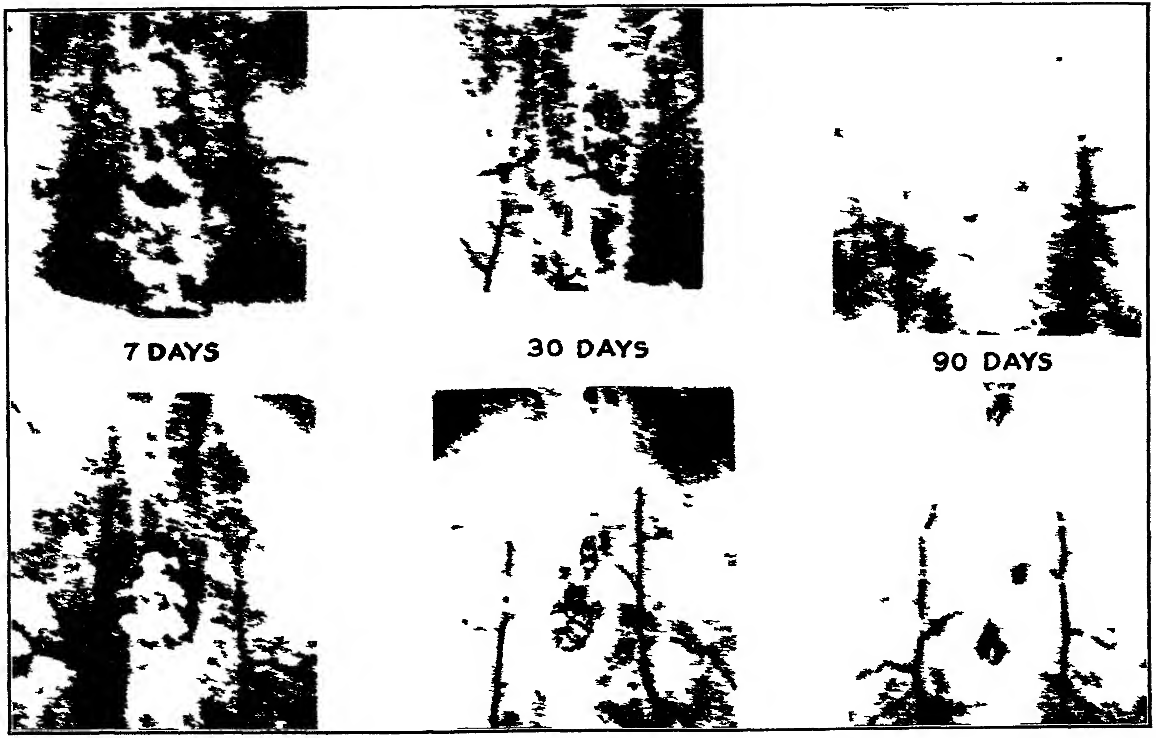
Chert.—An industrial dust. Chemical analysis: Total silica, 76.1 percent. Petrographic examination: Quartz and chert about 60 percent (about 25 percent of the silica is normal quartz). Calcite about 40 percent. Median particle size, 0.95 microns. Geometric standard deviation, 1.3 microns.

Quartz-sericite.—The source of this dust is not known. Chemical analysis: Total silica, 81.04 percent; calcium oxide, 0.30 percent; magnesium oxide, 0.45 percent; sodium oxide, 0.10 percent; potassium oxide, 0.98 percent; iron oxide, 0.25 percent; aluminum oxide, 14.26 percent; total water, 2.61 percent. Petrographic examination: Quartz, about 50 percent; muscovite (variety, sericite), about 45 percent; fibrous sericite, less than 5 percent. Dust passed through a 325-mesh screen.

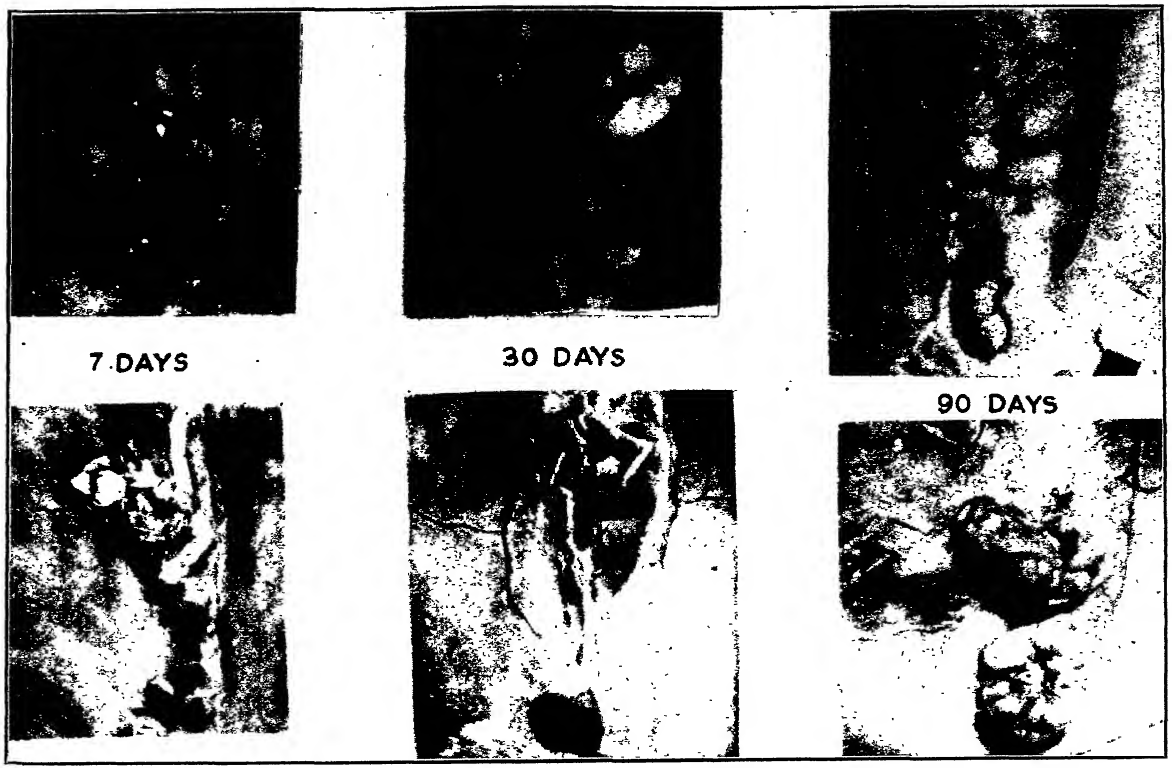
THE INERT GROUP

Dusts of this group produced the same type of reaction in the first 2 weeks after injection that was noted in all of the other dusts; namely, an initial foreign body irritation. This early fixation reaction was not severe and subsided quite rapidly. As the time between injection and autopsy increased, the nodules, at first raised and rounded, became flattened and spreading. The edges became irregular, and numerous fine dust particles were noted in the peritoneum adjacent to the edges of the nodules. Collections of these particles were found at various other points in the peritoneum. The amount of dust in the peritoneal cavity found 360 days after injection was approximately the same as that noted in 7 days. The injected dust was not absorbed and did not initiate a cellular proliferation. The only change noted was that of the distribution of the dust in the peritoneum. The particles became more widespread in their dispersion as the interval between injection and examination increased, and this dissemination was shown microscopically to have been effected by macrophages. Variations in the reactions of these dusts were primarily in the color of the nodules, produced by the characteristic color of the individual dust.

In 7 days microscopic examination showed that the dust nodule consisted of a large clump of densely packed dust with irregularities and lighter areas at its margin. No necrosis was noted with or about the dust. A narrow cellular zone, widest at the base, surrounded the dust. The nodule was covered by a thin layer of connective tissue merging into an underlying layer of fibroblasts. The basal portion was composed of fibroblasts, mostly in parallel arrangement. Some strands of fibroblasts were seen penetrating the dust mass. Only an occasional macrophage was noted near the dust. Isolated dust particles and small clumps of dust, some intracellular, were scattered throughout the cellular portion, and a few similar particles and clumps extended to a considerable distance in the peritoneal connective tissue adjacent to the edges of the nodules. Some of these particles were clearly in connective tissue cells and others were apparently in macrophages, but the color of the dust often obscured identification of the cells. Few to a moderate number of capillaries occurred throughout the nodules. As the duration of the tests increased, the macrophages became more numerous up to the sixtieth day of the tests. Fibrous tissue cells, many containing dust particles and a lesser number of fibroblasts, were also noted. After the peak of the increase in macrophages, connective tissue cells predominated in the remaining series. Fatty metamorphosis often occurred in about 60 days and increased progressively for the remaining period of the tests. Necrosis was not noted in nodules produced by inert dusts.



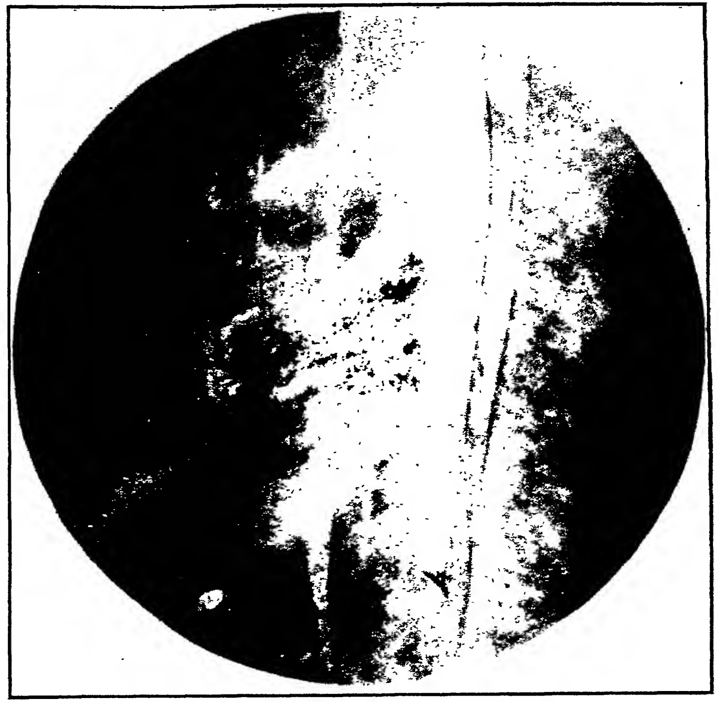
Above, calcite, below, limestone Appearance of nodules on anterior abdominal wall 7, 30 and 90 days after injection



Above, flint; below, chat. Appearance of nodules on anterior abdominal wall 7. 30, and 90 days after injection.

Above anthracite coal below jewelers rouge Appearance of nodules on anterior abdominal wall 7, 30 and 90 days after injection

Quartz nodule, 90 days after injection.



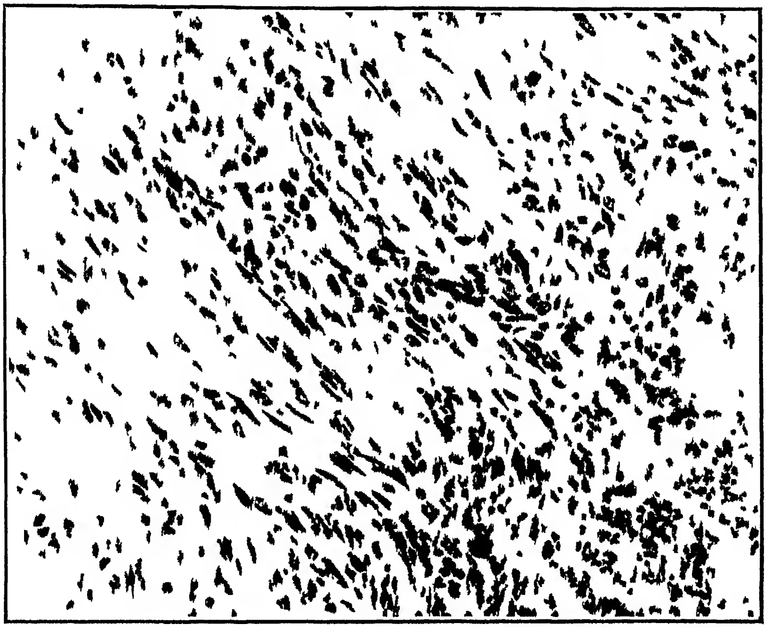
Calcite, 90 days after injection. Note fine, brown pigment granules in the peritoneum. These are all that remains of the nodule.

Limestone 7 days after injection X 655

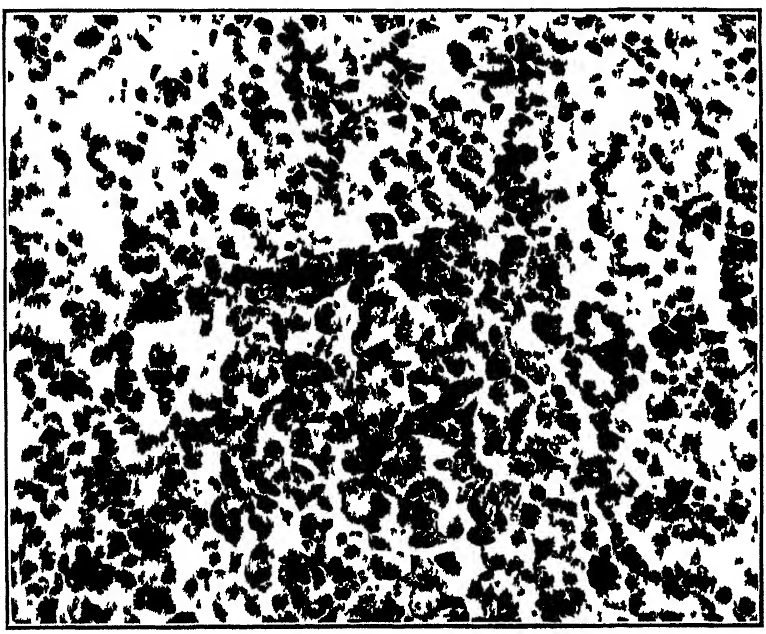
Limestone 30 days after injection X 655

Limestone 180 days after injection × [illegible]

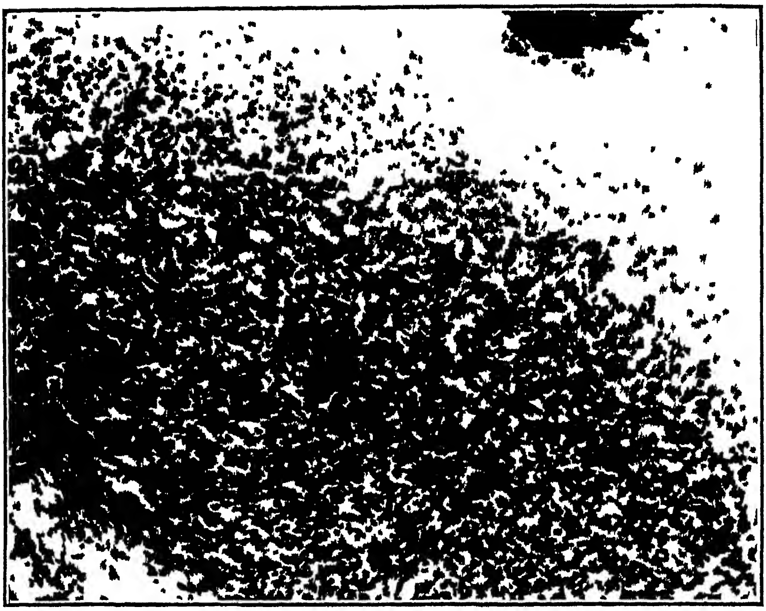
Limestone 360 days after injection × 655



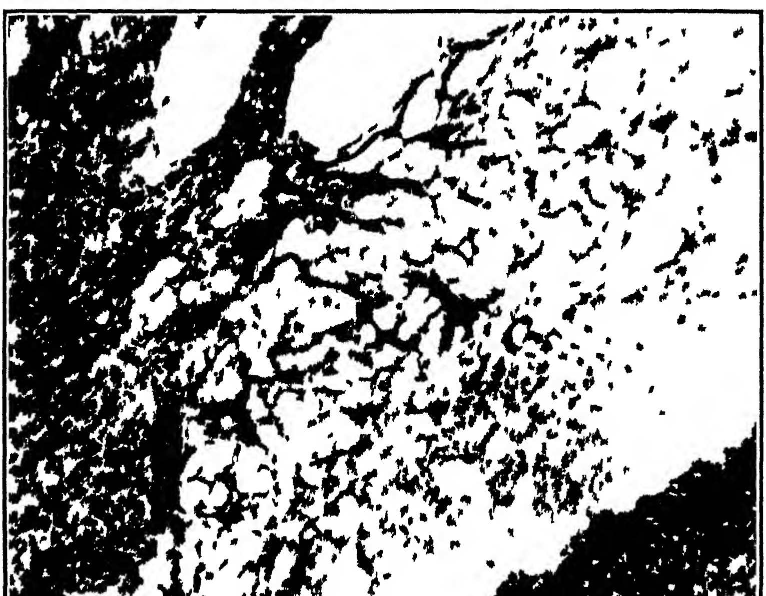
Quartz 7 days after injection X 65



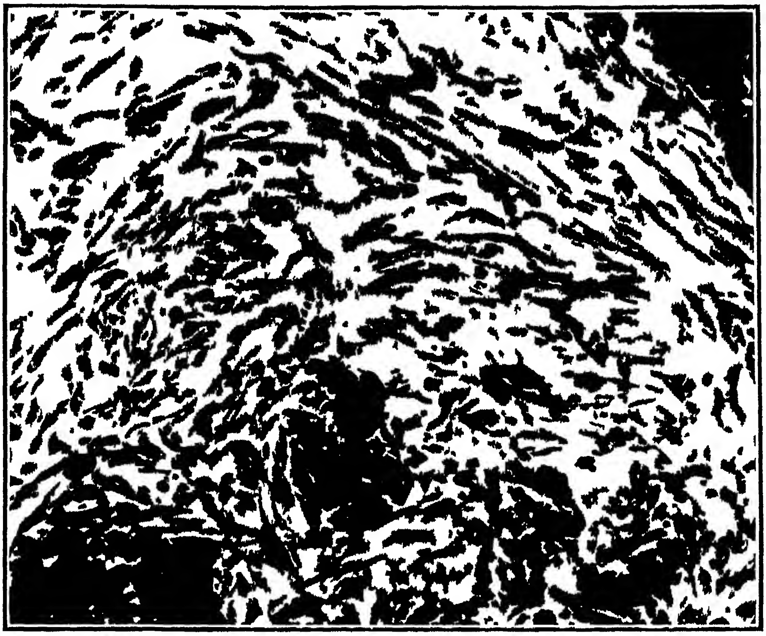
Quartz 30 days after injection X 65



Quartz 180 days after injection X 305

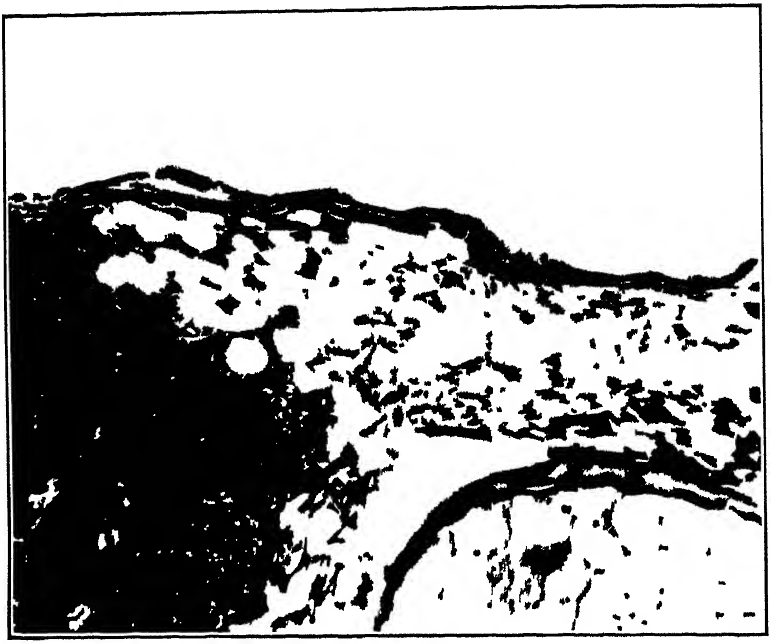


Quartz, 360 days after injection X 655

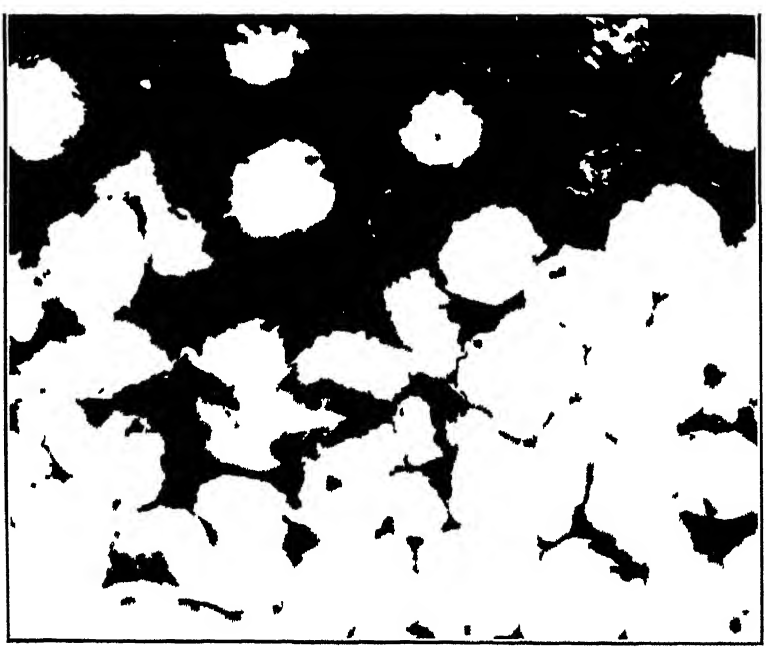


Anthracite coal 7 days after injection X 655

Anthracite coal, 30 days after injection X 655



Anthracite coal 180 days after injection X 305



Anthracite coal, 360 days after injection X 65

With certain dusts having a relatively large particle size (e. g., soapstone) and other physical characteristics there was a tendency for the slender dust particles to clump together in bundle-like groups. Macrophages arranged themselves concentrically about these groups and later fused together, forming aggregation giant cells with regularly spaced peripheral nuclei. These eventually assumed the appearance of an encircling capsule of a single layer of fibrous connective tissue cells. Other variations consist in changes in the speed with which isolated and grouped dust particles were carried into the peritoneum adjacent to the nodule and in colorations produced by characteristic tints of the individual dusts.

DUSTS CAUSING AN INERT REACTION

Anthracite coal.—An industrial dust. Chemical analysis: Ash, 16.0 percent; silica, 8.6 percent. Petrographic examination: Coal, about 95 percent, inorganic material, about 5 percent. About 95 percent of the inorganic material is quartz, about 5 percent is calcite, siderite, limonite, and rutile. Median particle size, 0.70 microns. Geometric standard deviation, 1.6 microns.

Anthracite coal.—An industrial dust. Chemical analysis: Ash, 12.6 percent; silica, 6.6 percent. Petrographic examination: Coal about 95 percent; inorganic material, about 5 percent. About 60 percent of the inorganic material is quartz; about 40 percent is calcite, with an occasional crystal of rutile. Median particle size, 0.45 microns. Geometric standard deviation, 2.1 microns.

Bituminous coal.—An industrial dust. Chemical analysis: Ash, 8.5 percent; silica, 0.8 percent. Petrographic examination: Mineral content (calcite) about 1 to 2 percent. Median particle size, 0.80 microns Geometric standard deviation, 1.3 microns.

Bituminous coal.—An industrial dust. Chemical analysis: Ash, 8.0 percent; silica, 3.5 percent. Petrographic examination: Mineral content (quartz, calcite, clay) between 1 and 3 percent. Median particle size, 0.70 microns. Geometric standard deviation, 1.8 microns.

Precipitator ash.—An industrial dust. Chemical analysis: Total silica, 44.7 percent; moisture, 0.1 percent. Petrographic examination: Mostly spherical fused glass particles, with some semifused masses of crystallites, quartz, possibly calcite and coal fragments. Median particle size, 1.10 microns. Geometric standard deviation, 1.6 microns.

Precipitator ash.—An industrial dust. Chemical analysis: Total silica, 49.86 percent; calcium oxide, 6.03 percent; magnesium oxide, 3.01 percent; iron and aluminum oxides, 40.46 percent. Petrographic examination: Loosely consolidated, white, soft, grit-free ash, about 40 percent; partly rounded aggregates of semifused ash, about 45 percent; smooth fused glass globules, about 10 percent; normal quartz

fragments, about 5 percent; unburned coal, less than 1 percent. Dust passed through a 325-mesh screen.

Soapstone.—An industrial dust. Chemical analysis: Total silica, 36.8 percent; calcium oxide, 5.0 percent; magnesium oxide, 22.7 percent. Petrographic examination: Talc, about 55 percent; dolomite, about 30 percent; tremolite, about 15 percent. No quartz observed. Dust passed through a 325-mesh screen.

Soapstone.—An industrial dust. Chemical analysis: Total silica, 49.9 percent; calcium oxide, 1.7 percent; magnesium oxide, 26.2 percent. Petrographic examination: Talc, as plates or fibrous splinters, about 65 percent; tremolite, as long, fibrous crystals, about 30 percent; dolomite, about 5 percent. Median particle size, 3.25 microns. Geometric standard deviation, 1.7 microns.

Talc.—An industrial dust. Chemical analysis: Total silica, 49.0 percent; calcium oxide, 8.8 percent; magnesium oxide, 22.6 percent. Petrographic examination: Tremolite, about 60 percent; talc, about 40 percent. Dust passed through a 325-mesh screen.

Talc.—An industrial dust. Chemical analysis: Total silica, 56.54 percent; calcium oxide, 6.25 percent; magnesium oxide, 30.74 percent; calcium silicate, 11.00 percent; calcium carbonate, 1.88 percent; iron and aluminum oxides, 1.04 percent; ignition loss, 4.60 percent. Petrographic examination: Talc, mostly fibrous, about 75 percent; tremolite, partly altered to talc, about 25 percent; calcite and (or) dolomite, about 1 percent. Median particle size, 0.85 microns. Geometric standard deviation, 1.4 microns.

Asbestos (chrysotile).—An industrial dust. Chemical analysis: Total silica, 37.52 percent; calcium oxide, 2.00 percent; magnesium oxide, 36.85 percent; sodium oxide, 0.54 percent; potassium oxide, 0.08 percent; iron oxide, 7.70 percent; combined oxides, 10.30 percent; total water, 12.86 percent. Petrographic examination: Serpentine, in part chrysotile, about 85 percent; dolomite, about 5 percent; magnetite and (or) chromite, about 5 percent; talc, less than 5 percent. Dust was injected as received.

Crocidolite.—An industrial dust. Chemical analysis: Total silica, 50.86 percent; calcium oxide, 0.68 percent; magnesium oxide, 2.76 percent; sodium oxide, 5.72 percent; potassium oxide, 0.08 percent; iron oxide, 38.33 percent; combined oxides, 39.03 percent; total water, 5.02 percent. Petrographic examination showed fibrous material only. Dust was injected as received.

Amosite.—An industrial dust. Chemical analysis: Total silica, 48.31 percent; calcium oxide, 0.48 percent; magnesium oxide, 0.66 percent; sodium oxide, 0.72 percent; potassium oxide, 0.02 percent; iron oxide, 44.22 percent; combined oxides, 46.37 percent; total water, 3.62 percent. Petrographic examination showed predominating

individual fibers and about 1 or 2 percent of dolomite. Dust was injected as received.

Feldspar.—Chemical analysis: Total silica, 65.9 percent; calcium oxide, 0.81 percent; magnesium oxide, 0.10 percent; aluminum oxide, 19.55 percent; iron oxide, 0.28 percent; potassium oxide, 8.98 percent; sodium oxide, 3.18 percent. Petrographic examination: Feldspar (plagioclase-microcline), about 95 percent; normal quartz, about 5 percent. Dust passed through a 325-mesh screen.

Silicon carbide.—Pure manufactured silicon carbide. Chemical analysis: Silicon, 67.5 percent. Petrographic examination showed no impurities. Median particle size, 0.95 microns. Geometric standard deviation, 1.2 microns.

Hematite (jewelers' rouge).—An industrial dust. Chemical analysis: Total silica, 1.5 percent; iron oxide, 98.3 percent. Petrographic examination showed no impurities. Median particle size, 0.75 microns. Geometric standard deviation, 1.5 microns.

Calcium phosphate.—An industrial dust. Chemical analysis: Calcium phosphate, 75.38 percent; calcium carbonate, 3.98 percent; calcium fluoride, 6.80 percent; magnesium carbonate, 0.51 percent; iron oxide, 3.08 percent; aluminum oxide, 3.12 percent; free silica, 2.70 percent; combined silica, 1.87 percent. Petrographic examination: Earthy phosphates (not apatite), about 97 percent; normal and chalcedonic quartz, about 3 percent. Dust passed through a 325-mesh screen.

Sericite—A pure mineral dust. Chemical analysis: Total silica, 51.74 percent; calcium oxide, 0.61 percent: magnesium oxide, 1.74 percent; sodium oxide, 3.40 percent; potassium oxide, 4.48 percent; iron oxide, 5.83 percent; combined oxides, 31.82 percent; total water, 6.26 percent. Petrographic examination: Sericite and feldspar residues (fibrous sericite predominates), about 95 percent; quartz, less than 5 percent. Dust passed through a 325-mesh screen.

SUMMARY

1. A definite quantity of dust in suspension was injected intraperitoneally into guinea pigs.

2. The response caused by the dust in the peritoneal cavity was constant in all of the animals injected with an individual dust and could be classified as an absorptive, proliferative, or inert reaction.

3. In the absorptive reaction the injected dust disappeared from the peritoneal cavity without the production of scar tissue.

4. In the proliferative reaction the nodules produced by the dust continued to increase in size up to 90 days after injection

5. In the inert reaction the amount of injected dust remained approximately the same in the peritoneal cavity throughout the

various periods, but the nodules became more flattened and fine particles of dust were carried over rather extensive areas in the peritoneum by phagocytes.

6. Calcite, limestone, precipitated calcium carbonate, gypsum, and cement exhibited an absorptive reaction.

7. Quartz, tripoli, and siliceous chert produced a proliferative reaction.

8. Anthracite coal, bituminous coal, precipitator ash, soapstone, talc, asbestos, crocidolite, amosite, feldspar, silicon carbide, hematite, calcium phosphate, and sericite were inert in reaction.

CONCLUSIONS

The tissue of the peritoneal cavity responds actively to a dust introduced as a foreign body, and this response is of such a character that it may be used as a basis for the classification of industrial dusts. This response falls into three groups, namely, one of absorption, one of proliferation, and one of inertness. While, in these experiments, animals were kept on test for as long as 360 days, the response is sufficiently well marked in 90 days to determine the type of reaction, and often conclusions can be reached in 30 days, particularly if the reaction is one of absorption or proliferation The reaction elicited by each dust was constant and uniform in all the animals injected with that dust.

The results obtained by the method used so far seem to indicate that some relationship exists between the types of reactions produced in the peritoneal tissue by a given dust and the ability of this dust to produce a characteristic type of pneumoconiosis. Thus, an absorptive reaction may indicate that the dust is relatively harmless, while a proliferative reaction, characteristic of pure silica (quartz) may be associated with definite ability to produce a nodular type of pulmonary fibrosis.

Interpretation of the significance of the dusts causing inert reactions is more difficult, but it appears logical to assume that dusts which show a tendency to remain in the tissues should be considered as potentially harmful, though not as dangerous as those causing a proliferative response. It is likewise logical to assume, and it has been proved to some extent in this laboratory, that silica mixed with an inert dust causes a modified proliferative reaction.

With this biological method of classification, which, in a number of instances, has been correlated with clinical observations and industrial surveys, it is quite possible to use intraperitoneal injection methods to determine the pneumoconiotic potentialities of a dust in a relatively short time, usually 60 days.

ACKNOWLEDGMENTS

Acknowledgment is made of the kindness of Mr. W. A Selvig of the United States Bureau of Mines and of Associate Chemist F. H. Goldman of the United States Public Health Service for the chemical analyses of the dusts used in these experiments. The petrographic examinations were made by Dr. Alton Gabriel of the United States Bureau of Mines.

Acknowledgment is also made to Technical Editor T. I. Edwards and Passed Assistant Sanitary Engineer J. M. DallaValle, of the Public Health Service, for assistance in preparing this report.

GLUTATHIONE AND MALIGNANT GROWTH

By Carl Voegtlin, *Medical Director*, J. M. Johnson, *Senior Chemist*, and J. W. Thompson, *Associate Pharmacologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

Fifteen years have passed since the discovery of glutathione as a normal constituent of mammalian tissues. During that time much work has been done with this interesting substance, but our present knowledge is quite insufficient to give a clear picture of its physiological functions. However, there are definite indications that glutathione can exert a marked influence on the proliferation of cells and on the activity of certain intracellular enzymes. It is of interest, therefore, to ascertain whether under certain conditions glutathione can influence the proliferation of neoplasms. This question has never before been submitted to an experimental test.

The plan of procedure in the present investigation is based on the following considerations. The tripeptide glutathione is composed of cystine, glutamic acid, and glycine. A diet deficient in cystine and methionine, but adequate in all other respects, does not permit normal growth of young rats. Therefore, the first problem to be solved is to determine whether neoplastic growth can be inhibited by feeding adult tumor animals on a diet deficient in cystine and methionine, but adequate enough for maintenance. If, under these conditions, tumor growth is inhibited, then the next question is whether the administration of glutathione to animals maintained on the deficient diet will accelerate tumor growth.

EXPERIMENTAL

The diet used has the following composition:

	Parts
Whole-milk powder	16 7
Cod-liver oil	3 0
Brewers' yeast	4 0
Starch	52 3
Salt mixture no. 185	4 0
Butterfat	20. 0

Based on the total nitrogen determinations (Kjeldahl), 16.7 g of whole-milk powder supplies 5 g of milk protein, and 4 g of brewers' yeast are equivalent to 1.6 g of yeast protein. However, allowance should be made for the presence in yeast of considerable amounts of non-protein nitrogen, such as nucleic acid. The vitamin B_1 and B_2 potency of the laboratory sample of brewers' yeast (no. 2) used is given by Smith and Seidell (1936). The salt mixture is no. 185, devised by McCollum. As will be noted, this basal diet is similar in composition to that used by Jackson and Block (1932) for proving that methionine is capable of stimulating normal growth in rats on a diet low in cystine.

Growth of young mice on deficient diet.—In order to furnish evidence that this basal diet does not permit normal growth, healthy young male mice from our breeding colony were placed on this diet for about 2 months. Chart 1 illustrates the results which were obtained. It is evident that normal growth is greatly inhibited. Furthermore, it is obvious that supplementing the diet with 0.4 percent of *l* cystine results in an abrupt stimulation of growth, the rate approximating that obtained with an adequate diet (Thompson and Mendel, 1917–18).

Tumor growth on deficient diet.—For the study of the influence of the deficient diet upon malignant growth we again chose, as in previous work, adult mice from our breeding colony, which was originally obtained through the kindness of Dr. B. T. Simpson and Mr. M. C. Marsh, of the State Institute for the Study of Malignant Disease, in Buffalo. Female mice showing small spontaneous mammary carcinomas were put into individual cages and fed on the deficient diet for a sufficiently long time to permit a fair estimate of the tumor-growth rate. The latter was estimated by carefully measuring the two greatest diameters of the tumors twice weekly and plotting the tumor areas (product of the two dimensions) as ordinates against time in days as abscissas. The animals were given the diet *ad libitum*, and a careful record of the food consumption was kept, except in the experiments illustrated by chart 2. The animals were weighed every time that the tumor size was measured. The experiments were terminated in all cases when the tumors ulcerated, because ulceration introduces uncontrollable factors. At the conclusion of each experiment the tumors were submitted for histological examination to Passed Assistant Surgeon L. L. Ashburn for verification of their malignant nature. We are indebted to Dr. Ashburn for his kind assistance.

The vast majority of tumor animals placed on the deficient diet showed a greatly reduced rate of tumor growth as compared with the high tumor-growth rate in animals maintained on the stock diet, which is composed essentially of 30 percent whole milk powder and 70 percent ground whole wheat. It is well known that considerable

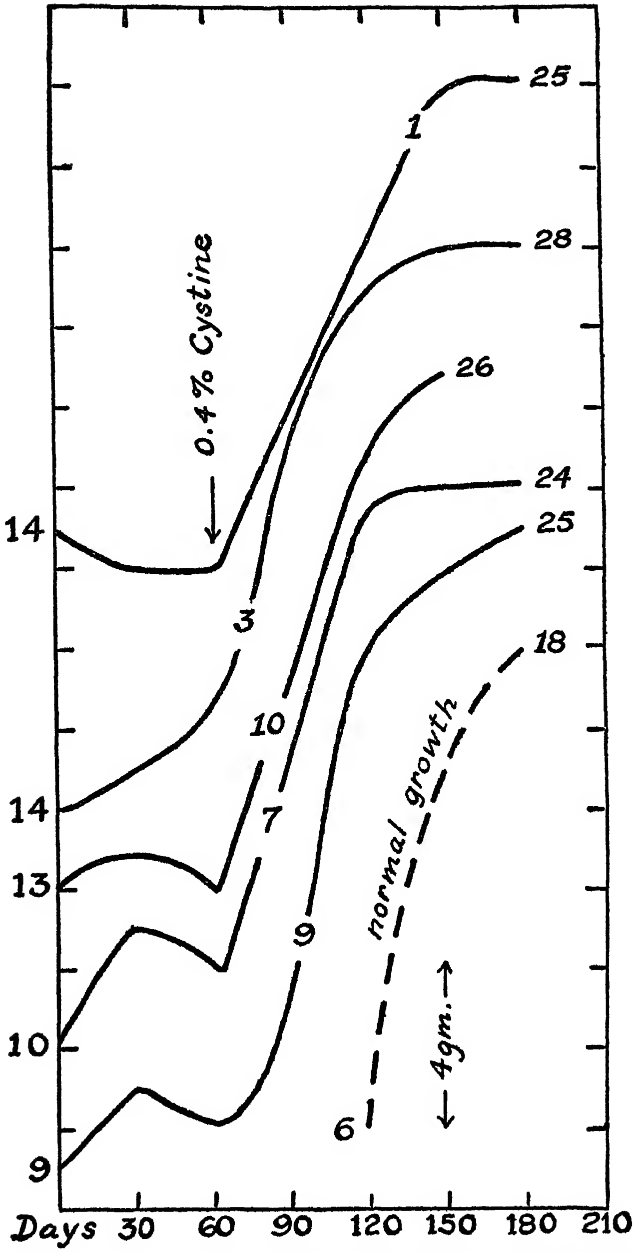


CHART 1.—Growth of young mice Shows failure of normal growth on the deficient diet and the prompt resumption of growth following the administration of the cystine supplement The figures at the beginning and end of the curves represent the corresponding body weights in grams (Numbers in broken sections of the graphs in the charts accompanying this article represent the numbers of experimental animals)

differences occur in the individual growth rate of healthy young animals maintained on partially deficient diets, even under the best controlled conditions. Similar differences were encountered in the tumor growth in the animals included in this report. These differences are clearly brought out in the first part of the curves presented in charts 2 to 6. Some of the tumors become stationary as soon as the animal is placed on the deficient diet; others grow for some time and then fail to grow; still others grow at a constant moderate rate until the supplement is given: and a few tumors were eliminated because they showed a relatively high growth rate and were therefore unsuited for testing the stimulating action of a supplement

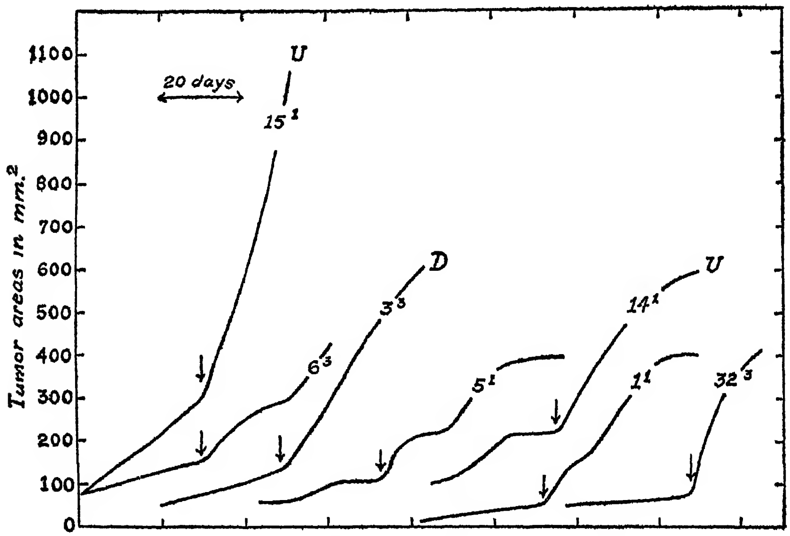


CHART 2.—Tumor growth The first part of the curves shows the slow tumor growth on the deficient diet. The addition of 0.6 percent cystine to the diet (indicated by the arrow) shows the prompt stimulating action of this supplement on tumor growth (U—ulcerated, D—died. Superior figures identify the animals in the several groups for record and for use in future studies.)

In two instances the tumors apparently regressed One of these, which was of fairly large original size (150 mm²), ulcerated on the twelfth day of the experiment and disappeared on the sixteenth day. From the thirtieth day on, the diet of this animal was supplemented with 0.4 percent cystine. About 48 days later a small tumor had reappeared in the same location as that of the first tumor. This tumor grew rapidly and the animal died 25 days later. A tumor in another animal apparently completely regressed on the 19th day, but reappeared on about the one hundred and tenth day. These two instances of apparent regression are mentioned only incidentally, because we have never observed regression so far in many hundred tumor animals maintained on the stock diet.

Action of cystine supplement on tumor growth.—As has been mentioned previously, growth is strikingly stimulated in young mice maintained on the deficient diet, if the latter is supplemented with cystine. A group of tumor animals was therefore kept on the deficient diet for about 1 month. Thereafter the diet was supplemented with 0.6 percent of *l*–cystine. All of the 23 tumors of this series showed an abrupt stimulation of growth following the administration of the supplement. Chart 2 includes seven representative tumor growth curves of this series. The vertical arrows on the curves indicate the time at which the diet was supplemented with cystine. Table 1 gives the corresponding average body weights of each tumor animal on the basal diet and on this diet supplemented with cystine. It will be noted that there was a slight increase in weight during the period when the supplement was given.

TABLE 1.—*Average body weights of tumor animals on basal diet and on basal diet supplemented with 0.6 percent cystine. (Corresponding tumor growth plotted in chart 2)*

No of animal [a]	Average weight on basal diet	Average weight on basal diet +0 6 percent cystine
	Grams	*Grams*
15 [1]	28	30
6 [1]	26	29
31 [1]	30	33
5 [1]	25	27
14 [1]	27	28
1 [1]	25	27
32 [1]	28	29

[a] The superior figures in the first column of the tables differentiate the animals in the several groups and are retained for the identification of these animals in the original records and in connection with future studies.

The action of glutathione on tumor growth.—Pure crystalline reduced glutathione was prepared from bakers' yeast according to the method of Pirie (1930). Analysis showed that it had the correct nitrogen content. As it is not definitely known whether part or all of the glutathione incorporated in the diet is hydrolyzed before absorption from the gastrointestinal tract, it was deemed advisable to administer it subcutaneously. It was found that a 10 percent solution of glutathione, injected subcutaneously, produces considerable local tissue injury. Therefore, the substance was dissolved in sterile glass-distilled water, neutralized with NaOH, and brought up to volume with distilled water so as to yield a 10 percent solution. This solution was freshly prepared as needed. The subcutaneous injections were made daily except Sundays. No local or systemic reactions were observed. The results are illustrated by charts 3 to 6. The vertical arrows on

the curves indicate the beginning of glutathione injections. A single arrow implies that the dose was 15 mg per animal, a double arrow 30 mg, and a triple arrow 45 mg per mouse.

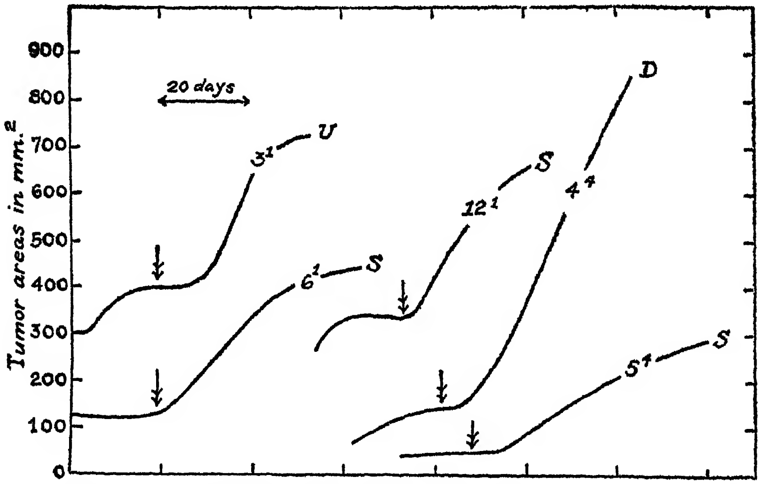


CHART 3.—Tumor growth. The first part of the curves shows the inhibition of tumor growth on the deficient diet. The subsequent administration of glutathione (as indicated by arrows) stimulates tumor growth. (U=ulcerated; D=died; S=killed)

With very few exceptions the administration of glutathione produced a marked stimulation of tumor growth. The dose necessary to cause this effect apparently varies in different animals. For in-

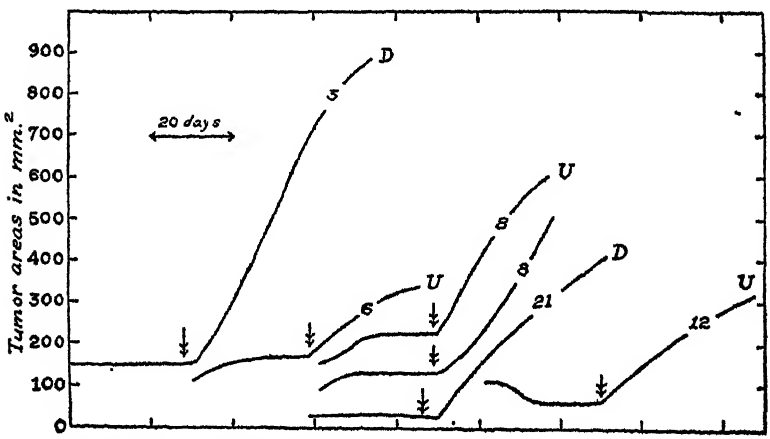


CHART 4.—Tumor growth. Inhibition of tumor growth and subsequent stimulating action of glutathione.

stance, in chart 5, 15 mg of glutathione increased the growth rate of the two tumors (7) in one animal. Tumor 24, however, on the same dosage was stimulated only temporarily, but again began to increase in size when the dose was increased to 30 mg. A similar situation is

met with in the case of tumor 17, where 45 mg were required to produce a prolonged and rapid increase in tumor size. In chart 6 curves of 4 multiple tumors (9) are plotted, two of which responded only

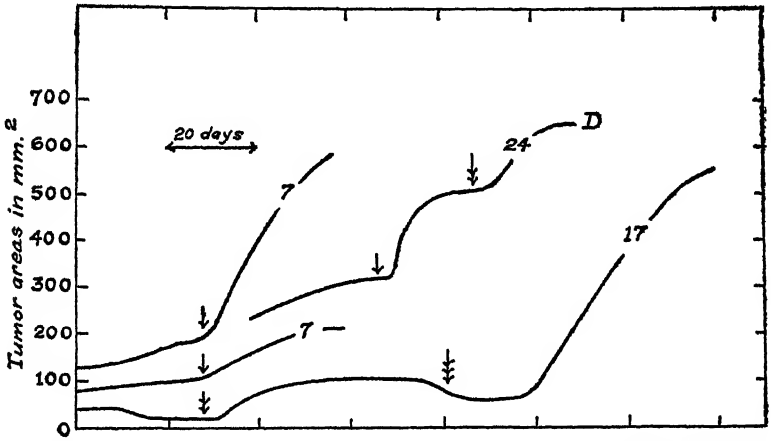


CHART 5.—Tumor growth. Confirms results illustrated by Charts 3 and 4 and in addition shows that the stimulating action of glutathione depends on dosage

feebly to 30 mg and the other two not at all. It is quite possible that this failure of response may have been due to a too rapid excretion of the injected glutathione.

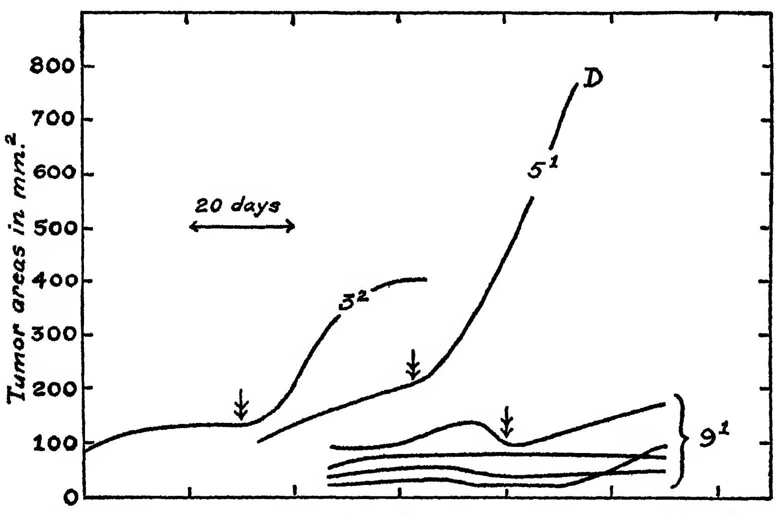


CHART 6.—Tumor growth. Confirms results illustrated by previous charts and also shows an exceptional case of lack of response to the administration of glutathione (curves 9¹).

The data on the average daily food consumption included in tables 2 and 3 indicate that the increase in the tumor growth rate following the administration of glutathione cannot be attributed to an increased food consumption.

TABLE 2.—*The average body weights of tumor animals and the average daily food consumption calculated for 25 grams of body weight. (Corresponding tumor growth plotted in chart 3)*

No. of animal	Basal diet		Basal diet + glutathione	
	Average weight	Average food consumption	Average weight	Average food consumption
	Grams	*Grams*	*Grams*	*Grams*
3[1]	33	2 88	32	2 72
6[1]	28	2 79	31	2 59
12[1]	29	3 62	29	2 99
4[4]	31	2 71	33	2 52
5[4]	28	2 52	31	2 77

TABLE 3.—*The average body weights of tumor animals and the average daily food consumption calculated for 25 grams of body weight. (Corresponding tumor growth plotted in charts 4, 5, and 6)*

No. of mouse	Basal diet		Basal diet + glutathione	
	Average weight	Average food consumption	Average weight	Average food consumption
	Grams	*Grams*	*Grams*	*Grams*
3	29	2.67	30	2.81
6	24	2 43	26	2.67
8	31	2.70	32	2 15
21	28	2.70	27	2.73
12	29	2 84	27	3.11
7	35	2 15	34	1.89
24	24	1 92	[a] 23 [a] 21	[a] 2.53 [a] 2.36
17	23	3.18	[a] 24 [a] 25	[a] 2.74 [a] 3.35
3[1]	30	2.91	29	2.91
5[1]	20	3.80	24	3.56
9[1]	29	3.01	31	3.48

[a] The average weight and the average food consumption of mouse no. 24 and mouse no. 17 on the basal diet + glutathione are given in each case for two periods, corresponding to the two different doses of glutathione used (see chart 5)

DISCUSSION OF RESULTS

The results of the present investigation clearly show that it is possible by means of a diet deficient in cystine (and presumably methionine) to cause a marked slowing or even a cessation of the growth of a typical neoplasm. This same diet inhibits normal growth of young mice. Moreover, it is quite clear that, following a period of inhibited tumor growth, the administration of either cystine or glutathione causes a marked stimulation of tumor growth. A similar increase in the growth rate of young mice is produced by the cystine supplement. A paper has just appeared in which Dyer and du Vigneaud (1936) report that the growth of normal rats on a cystine deficient diet is accelerated by the oral or subcutaneous administration of glutathione. It would seem, therefore, that with respect to the growth-stimulating response to cystine or glutathione, respectively, there is no essential difference between normal growth of young mice and rats on the one hand, and the growth of the spontaneous mammary carcinoma on the other hand.

What is the explanation of the mechanism responsible for the stimulating effect of glutathione on malignant growth? It would be prema-

ture to offer an explanation in view of the complex and incompletely understood metabolic relationship between glutathione, cystine, cysteine and methionine (see Lewis, 1935). However, it can be said, at least, that progressive neoplastic growth requires a sufficient supply of cystine (or cysteine) for the synthesis of tumor proteins. Since glutathione occurs not only in normal but also in malignant tissues, it would seem also that the growing tumor must be supplied with glutathione or its constituent amino acids, particularly cystine (or cysteine). We reserve further comments on these questions until an investigation dealing with the action of methionine on tumor growth is completed.

One point needs emphasis, namely, that the growth of this mammary carcinoma can be inhibited by a diet deficient in cystine and methionine. In previous work (Voegtlin and Thompson, and Voegtlin and Maver, 1936) it was shown that a lysine-deficient diet also inhibits tumor growth. Thus evidence is accumulating which indicates that the proliferation of this typical malignant tumor can be inhibited by diets deficient in certain essential amino acids or peptides. It remains to be seen whether other types of malignant tumors, especially those induced by carcinogenic substances, behave similarly. Work along this line is in progress.

CONCLUSIONS

The growth rate of a spontaneous mammary carcinoma can be controlled by a diet deficient in cystine and methionine.

Following a period of growth inhibition, the administration of either cystine or glutathione exerts a striking stimulating action upon tumor growth.

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DEATHS DURING WEEK ENDED NOV. 14, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 14, 1936	Corresponding week, 1935
Data from 86 large cities of the United States		
Total deaths	8,134	7,725
Deaths per 1,000 population, annual basis	11.4	10.8
Deaths under 1 year of age	553	496
Deaths under 1 year of age per 1,000 estimated live births	50	45
Deaths per 1,000 population, annual basis, first 46 weeks of year	12.1	11.3
Data from industrial insurance companies		
Policies in force	68,609,080	67,721,419
Number of death claims	11,369	10,254
Death claims per 1,000 policies in force, annual rate	8.7	7.9
Death claims per 1,000 policies, first 46 weeks of year, annual rate	9.8	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended Nov. 21, 1936, and Nov. 23, 1937

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 21, 1936, and Nov. 23, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935
New England States:								
Maine	3				26	121	0	0
New Hampshire		1			4		0	0
Vermont	1				3	41	0	0
Massachusetts	6	7			75	62	2	2
Rhode Island					65	32	0	0
Connecticut	6	1	4	2	75	55	0	1
Middle Atlantic States:								
New York	29	32	[1] 13	[1] 4	104	481	8	8
New Jersey	11	25	17	8	28	23	0	0
Pennsylvania	30	60			50	133	8	8
East North Central States:								
Ohio	51	90	6	11	0	115	4	1
Indiana	40	80	13	15	7	7	3	0
Illinois	37	87	12	14	7	22	7	4
Michigan	32	23	1	2	31	37	2	6
Wisconsin	7	5	23	40	40	70	1	0
West North Central States:								
Minnesota	24	7		1	17	41	0	1
Iowa	3	28	3		1	7	3	1
Missouri	28	68	40	80	3	17	2	3
North Dakota	1	2	9	13	4	8	0	0
South Dakota	1	2		1	2	0	0	0
Nebraska	2	7			3	3	1	2
Kansas	17	16	1	12	4	11	1	0
South Atlantic States:								
Delaware		2		1	12	64	0	0
Maryland [2]	11	16	7	9	42	6	9	3
District of Columbia	8	23		2	8	2	0	2
Virginia	92	68			23	23	4	6
West Virginia	22	48	20	25		18	2	0
North Carolina [3]	100	78	9	10	18	87	1	0
South Carolina [4]	19	8	824	163	6	5	0	0
Georgia [4]	55	27		7		2	2	1
Florida	7	12	4	2	1	1	0	0
East South Central States:								
Kentucky	27	61	16	17	11	5	6	2
Tennessee	45	60	40	88	1	7	6	3
Alabama [4]	44	37	40	15	2	12	2	1
Mississippi [2]	25	23					1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 21, 1936, and Nov. 23, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935
West South Central States:								
Arkansas	6	28	23	41			0	0
Louisiana	27	24	24	4	1	8	1	4
Oklahoma [3]	7	23	61	51	3	2	0	5
Texas [4]	45	153	83	147	9	3	1	0
Mountain States:								
Montana	2	4	1	11	1	19	1	0
Idaho			5	2	73	14	1	0
Wyoming					2	3	0	0
Colorado	1	10			4	5	2	1
New Mexico	7	5	3	4	21		0	3
Arizona	1	5	22	36	18	1	0	1
Utah [2]	1				17	1	3	0
Pacific States:								
Washington			1		10	87	3	1
Oregon		2	37	23	5	264	0	0
California	57	62	45	44	34	204	7	4
Total	947	1,329	913	864	875	2,094	94	74
First 47 weeks of year	24,806	33,031	148,788	111,757	277,005	709,423	6,863	5,075

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935
New England States:								
Maine	1	0	11	24	0	0	1	2
New Hampshire	0	0	2	6	0	0	0	1
Vermont	1	0	6	5	0	0	1	1
Massachusetts	1	10	105	193	0	0	1	1
Rhode Island	0	2	23	9	0	0	0	0
Connecticut	2	6	85	54	0	0	3	1
Middle Atlantic States:								
New York	4	28	334	395	0	0	8	13
New Jersey	0	4	51	79	0	0	2	11
Pennsylvania	4	13	391	397	0	0	21	15
East North Central States:								
Ohio	9	1	212	252	0	0	5	4
Indiana	0	0	124	189	2	2	3	3
Illinois	9	7	306	485	1	2	11	12
Michigan	2	8	291	222	1	0	3	4
Wisconsin	0	2	225	352	14	6	1	3
West North Central States:								
Minnesota	2	4	145	257	5	0	0	3
Iowa	3	2	80	116	2	2	3	3
Missouri	4	1	74	150	4	2	13	8
North Dakota	1	0	35	31	16	6	0	0
South Dakota	2	0	86	73	6	8	0	1
Nebraska	2	0	27	85	0	48	0	0
Kansas	2	0	231	127	10	11	3	6
South Atlantic States:								
Delaware	0	0	5	10	0	0	0	0
Maryland [2]	0	5	62	71	0	0	10	15
District of Columbia	0	1	12	2	0	0	1	0
Virginia	0	1	75	51	0	0	13	13
West Virginia	0	0	77	119	0	2	14	5
North Carolina [3]	0	7	105	76	0	0	10	4
South Carolina [4]	1	1	11	2	0	0	10	2
Georgia [4]	6	0	34	23	0	0	12	2
Florida	2	0	3	7	0	0	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 21, 1936, and Nov. 23, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935	Week ended Nov. 21, 1936	Week ended Nov. 23, 1935
East South Central States:								
Kentucky	5	4	68	75	0	0	14	7
Tennessee	6	6	70	74	0	5	11	4
Alabama [4]	4	0	28	12	0	0	3	2
Mississippi [2]	2	0	23	28	0	1	3	8
West South Central States:								
Arkansas	5	0	5	13	0	2	4	2
Louisiana	1	0	17	15	0	0	15	9
Oklahoma [5]	17	1	21	20	0	0	19	11
Texas [4]	1	0	42	66	2	0	20	31
Mountain States:								
Montana	0	1	69	116	23	40	0	0
Idaho	0	0	31	34	1	0	3	2
Wyoming	0	0	9	76	2	0	0	0
Colorado	2	0	39	85	3	1	2	1
New Mexico	1	1	27	25	1	0	4	11
Arizona	1	1	14	32	0	0	3	1
Utah [2]	0	0	17	105	0	0	0	0
Pacific States:								
Washington	0	0	50	80	2	37	2	0
Oregon	0	6	27	04	13	0	4	4
California	11	14	255	245	1	7	7	7
Total	114	137	3,979	5,026	109	182	283	230
First 47 weeks of year	4,189	10,405	212,418	221,889	6,688	6,495	13,611	16,501

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Nov. 21, 1936, North Carolina, 1 case.
[4] Typhus fever, week ended Nov. 21, 1936, 34 cases, as follows: South Carolina, 2; Georgia, 20; Alabama, 7; Texas, 5.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1936										
California	12	191	106	38	169	13	35	715	2	83
Georgia	6	203	148	2,480	10	20	38	124	1	132
Illinois	17	134	39	17	50	1	256	832	11	93
Maryland	13	60	25	5	33	1	8	189	0	51
Michigan	4	71	6	11	80		58	720	1	49
Minnesota	6	68	4	1	67		5	292	22	3
Mississippi	3	96	2,172	5,598	62	266	15	65	0	42
Nevada			16				0	15	0	2
New York	33	70		12	236		33	878	0	121
Ohio	20	163	58	8	37		128	758	1	95
Pennsylvania	15	134		8	130	1	32	887	0	104
Rhode Island	1	3	1		128		0	70	0	3
Vermont		3			6		0	21	0	1
Wisconsin		17	82		74		13	652	9	14

October 1936

	Cases
Actinomycosis:	
California	3
Illinois	1
Michigan	2
Pennsylvania	1
Anthrax:	
California	1
New York	1
Chicken pox:	
California	454
Georgia	17
Illinois	383
Maryland	96
Michigan	682
Minnesota	273
Mississippi	107
Nevada	53
New York	832
Ohio	581
Pennsylvania	1,213
Rhode Island	75
Vermont	78
Wisconsin	713
Conjunctivitis, infectious:	
Georgia	13
Dengue:	
Georgia	6
Diarrhea:	
Maryland	82
Ohio (under 2 years, enteritis included)	37
Dysentery:	
California (amoebic)	13
California (bacillary)	51
Georgia (amoebic)	4
Georgia (bacillary)	9
Illinois (amoebic)	14
Illinois (amoebic carriers)	27
Illinois (bacillary)	35
Maryland	90
Michigan (amoebic)	4
Michigan (bacillary)	15
Minnesota (amoebic)	1
Minnesota (bacillary)	16
Mississippi (amoebic)	79
Mississippi (bacillary)	474
New York (amoebic)	12
New York (bacillary)	185
Ohio (amoebic)	1
Ohio (bacillary)	14
Pennsylvania (bacillary)	11
Epidemic encephalitis:	
California	5
Georgia	1
Illinois	11
Maryland	1
Michigan	1
New York	8
Ohio	1
Pennsylvania	6
Wisconsin	4
Food poisoning:	
California	66
German measles:	
California	52
Illinois	27
German measles—Contd.	
Maryland	16
Michigan	35
New York	51
Ohio	11
Pennsylvania	42
Rhode Island	2
Wisconsin	31
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Georgia	1,175
Michigan	1
Mississippi	239
Impetigo contagiosa:	
Maryland	35
Jaundice, epidemic:	
California	7
Lead poisoning:	
Maryland	3
Ohio	10
Mumps:	
California	1,335
Georgia	82
Illinois	128
Maryland	126
Michigan	272
Mississippi	141
Nevada	4
Ohio	54
Pennsylvania	426
Rhode Island	25
Vermont	25
Wisconsin	217
Ophthalmia neonatorum:	
California	3
Illinois	5
Maryland	1
Mississippi	7
New York [1]	9
Ohio	63
Pennsylvania	15
Wisconsin	1
Paratyphoid fever:	
California	3
Georgia	3
Illinois	2
Minnesota	1
New York	11
Ohio	1
Plague:	
California	1
Puerperal septicemia:	
Mississippi	11
Rabies in animals:	
California	85
Illinois	20
Mississippi	9
New York [1]	6
Relapsing fever:	
California	1
Septic sore throat:	
California	3
Georgia	38
Illinois	2
Maryland	11
Michigan	17
Septic sore throat—Contd.	
Minnesota	5
New York	24
Ohio	68
Wisconsin	10
Tetanus:	
California	11
Illinois	6
Maryland	1
Michigan	3
New York	11
Ohio	2
Pennsylvania	1
Trachoma:	
California	25
Georgia	1
Illinois	51
Mississippi	6
Ohio	3
Pennsylvania	3
Trichinosis:	
California	12
New York	6
Tularaemia:	
California	12
Georgia	3
Illinois	8
Minnesota	2
Ohio	1
Typhus fever:	
Georgia	108
Mississippi	1
New York	4
Undulant fever:	
California	14
Georgia	3
Illinois	8
Maryland	2
Michigan	8
Minnesota	4
Mississippi	3
New York	17
Ohio	3
Pennsylvania	9
Rhode Island	2
Vermont	5
Wisconsin	3
Vincent's infection:	
Illinois	25
Maryland	16
Michigan	36
New York [1]	80
Whooping cough:	
California	699
Georgia	60
Illinois	502
Maryland	493
Michigan	799
Minnesota	153
Mississippi	174
Nevada	26
New York	1,000
Ohio	580
Pennsylvania	1,682
Rhode Island	53
Vermont	42
Wisconsin	478

[1] Exclusive of New York City.

RODENT PLAGUE IN ELDORADO COUNTY, CALIF.

A chipmunk, *Eutamias speciosus frater* Allen, trapped 3 miles south of Meyers, Eldorado County, Calif., on October 9, 1936, was reported under date of November 11 to have been proved plague infected.

City reports for week ended Nov. 14, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	1	1	1	0	6	6	0	1	1	0	66
Fort Worth	4	------	1	0	5	6	0	1	1	4	32
Galveston	1	------	0	0	3	0	0	0	0	0	15
Houston	9	------	0	0	10	2	0	5	0	0	81
San Antonio	1	------	1	0	7	1	0	3	0	0	53
Montana:											
Billings	0	------	0	1	5	3	0	1	0	0	18
Great Falls	0	------	0	0	0	0	1	0	0	4	7
Helena	0	------	0	0	4	2	0	0	0	0	7
Missoula	0	------	0	0	1	0	0	0	0	0	10
Idaho:											
Boise	0	------	0	0	1	1	0	0	0	0	6
Colorado:											
Colorado Springs	4	------	0	0	2	3	0	2	0	0	13
Denver	3	------	1	1	8	9	0	3	0	50	74
Pueblo	0	------	0	0	3	0	0	0	1	2	7
New Mexico:											
Albuquerque	0	------	1	0	5	9	0	1	0	2	14
Utah:											
Salt Lake City	0	------	0	1	2	11	0	2	0	6	47
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	0	------	0	6	6	4	0	5	0	1	90
Spokane	0	------	0	0	1	9	0	0	1	1	20
Tacoma	0	------	0	0	2	3	0	1	0	0	30
Oregon:											
Portland	0	------	0	2	6	8	0	1	0	4	88
Salem	0	1	------	0	------	2	0	------	0	4	------
California:											
Los Angeles	16	19	1	2	21	18	0	20	1	74	354
Sacramento	4	------	0	1	5	10	0	3	0	10	40
San Francisco	1	2	0	3	8	16	0	11	0	24	174

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	2	0	0
Rhode Island:			
Pawtucket	2	1	0
Providence	0	1	0
New York:			
Buffalo	1	0	1
New York	9	2	2
Syracuse	0	0	1
Pennsylvania:			
Philadelphia	0	1	1
Ohio:			
Cincinnati	1	1	0
Cleveland	1	0	2
Columbus	2	1	0
Toledo	0	0	1
Indiana:			
Fort Wayne	0	0	1
Illinois:			
Chicago	3	2	5
Springfield	0	0	1
Michigan:			
Detroit	1	0	0
Minnesota:			
St. Paul	1	1	0
Iowa:			
Cedar Rapids	0	0	1
Missouri:			
St. Louis	0	0	3
Maryland:			
Baltimore	3	0	0
District of Columbia:			
Washington	3	2	0
Virginia:			
Norfolk	0	1	0
West Virginia:			
Huntington	1	0	0
Wheeling	0	1	0
South Carolina:			
Charleston	0	0	1
Georgia:			
Atlanta	2	0	0
Florida:			
Miami	1	1	0
Kentucky:			
Ashland	1	0	0
Covington	1	1	0
Tennessee:			
Knoxville	0	0	1
Nashville	1	0	0
Alabama:			
Birmingham	1	0	0
Oklahoma:			
Tulsa	2	1	12
Colorado:			
Pueblo	0	0	1
Utah:			
Salt Lake City	1	1	0
Washington:			
Spokane	0	0	1
California:			
Los Angeles	0	0	3
San Francisco	1	1	0

Epidemic encephalitis.—Cases: San Francisco, 1.

Pellagra.—Cases: Philadelphia, 1; Winston-Salem, 1; Charleston, S. C. 2; Savannah, 3; Montgomery, 1; New Orleans, 1; Dallas, 1; Los Angeles, 1.

Rabies in man.—Deaths: Memphis, 1.

Typhus fever.—Cases: Charleston, S. C., 1; Montgomery, 1.

FOREIGN AND INSULAR

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for November 27, 1936, pages 1659–1673. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued December 25, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India.—During the week ended November 14, 1936, cholera was reported in India as follows: Northwest Frontier Province, 2 fatal cases; Tuticorin, 5 cases, 3 deaths.

Plague

Ecuador—Babahoyo.—During the period November 13 to 18, 1936, 5 cases of plague with 2 deaths and 6 plague-infected rats were reported in Babahoyo, Ecuador.

United States—California.—A report of rodent plague in California appears on page 1701 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Ceylon—Colombo.—For the week ended October 10, 1936, 1 case of smallpox with 1 death was reported in Colombo, Ceylon.

Egypt—Alexandria.—During the week ended November 14, 1936, 1 fatal imported case of smallpox was reported in Alexandria, Egypt.

Ethiopia.—Up to October 31, 1936, 116 cases of smallpox were reported in Ethiopia. During the week ended November 14, 1936, 13 cases of smallpox were also reported.

Typhus fever

Correction.—An error appears in the table on page 1530 of the PUBLIC HEALTH REPORTS of October 30, 1936. The figure columns on the right-hand side of the page are all one line too high, which makes all the figures erroneous when read horizontally across the page. Attention has been called to the fact that the figures on the Panama Canal Zone line are erroneous, but this is true of each line in the right-hand half of the table. The right-hand half of the table showing typhus fever cases and deaths is published here as corrected.

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		March 1936	April 1936	May 1936	June 1936	July 1936	August 1936
Mexico:							
Puebla State: Puebla	C	3	3	3			
Queretaro State	C			1			
San Luis Potosi State: San Luis Potosi	C	6	3	3		3	
Sinaloa State	D					1	
Tlaxcala State	C	1					
Morocco (see also table above)	C	7	45	26	9	6	
Panama Canal Zone	C	1			2		
Peru	C	118	103	81			
Portugal (see also table above)	C	1	1		1		
Rumania	C	1,581	1,587	1,143	427	168	
Turkey	C	33	79	39	25	39	
Istanbul	C	4	1	1	1	2	
Union of South Africa:							
Cape Province	C	39	48	71	60	58	
Natal	C	3	1	2	1		
Orange Free State	C	5	18	10	24	2	
Transvaal	C	3	3		1		
Yugoslavia	C	113	106	125	78	53	16

Yellow Fever

Dahomey—Kandi.—On November 9, 1936, 1 suspected case of yellow fever was reported in Kandi, Dahomey.

Nigeria—Maiduguri.—On October 27, 1936, 1 case of yellow fever was reported in Maiduguri, Nigeria.

Senegal.—Yellow fever has been reported in Senegal as follows: On November 15, 1936, 1 case in Bambey and during the week ended October 31, 1936, 1 suspected case was reported in Thies.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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BY THE UNITED STATES PUBLIC HEALTH SERVICE

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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DURATION AND COST OF FEDERAL COMPENSATION CASES WITH DISEASE AS A COMPLICATING FACTOR[1]

[illegible]lliam M. Gafafer, *Senior Statistician, United States Public Health Service*

INTRODUCTION

Of interest particularly to legislators, employers, physicians, and to students of labor, sociology, and public health is the amount of compensation paid by States and the Federal Government to employees for injuries connected with occupational diseases. This interest exists at the present time, primarily, because of the fact that sooner or later many State governments will be confronted by the controversial question of whether they shall adopt a system of "schedule coverage" or "blanket coverage" with respect to occupational diseases. In general, schedule coverage provides for the compensation of certain diseases listed in a schedule, while blanket coverage, as the expression implies, provides compensation for all injuries caused by disease. In connection with coverage, the definition of "injury" as set down in the Workmen's Compensation Act of Wisconsin (1), a blanket coverage State for almost 20 years, is pertinent. "*Injury*," the act reads, "is mental or physical harm to an employee caused by accident or disease."

Workmen's compensation acts as originally adopted by the various States concerned themselves primarily with accidents and made little or no provision for occupational diseases. At the time of the writing of these acts it was known that, in a number of employments, disabilities and deaths resulted not only from accidents but also from diseases associated with certain occupations. A situation has developed in which the workmen's compensation laws of the different States are not uniform and vary greatly in the provisions which they contain. Thus in a few States all occupational diseases come under workmen's compensation laws, in other States only certain specified diseases, and in the greater number of States no diseases at all.

[illegible] now have blanket coverage. These States are California, Connecticut, Illinois, Massachusetts, Missouri, New York, North Dakota, and Wisconsin. Blanket coverage for diseases is also provided by three Federal laws originally passed in 1916, 1927, and 1928, respectively, and administered by the United States Employees'

[1] From the Office of Industrial Hygiene and Sanitation, U. S. Public Health Service.

Compensation Commission. These laws deal with compensation for, first, civil employees of the United States who suffer personal injury while in the performance of official duty; second, disability or death resulting from injury to certain employees in maritime employment upon the navigable waters of the United States; and, third, disability or death resulting from injury to employees in certain employments within the District of Columbia. With respect to the interpretation of *injury*, the United States Employees' Compensation Commission early took the view that the term covers not only accidents as ordinarily defined, but also any bodily injury or disease due to the performance of duties and causing incapacity for work (2). This interpretation was formally accepted in 1924 in an amendment to the act (3).

With the aid of basic data made available by the United States Employees' Compensation Commission, this paper will present analyses, principally, of the duration and cost of cases in which disease is a complicating factor. These cases occurring among civil employees and therefore coming under the Compensation Act of 1916, involve long-continued or permanent disability (both partial and total) and were incomplete on December 31, 1935, that is, compensation was still being paid on that date.

With regard to the population exposed or the number of civil employees within the scope of the Compensation Act of 1916, it was estimated by the Commission that the number for a period of approximately 15 years prior to 1933 did not exceed 700,000. "The number since 1933 has materially increased, and the Commission believes that at the present time it is probably between 900,000 and 1,000,000. It is impracticable to obtain definite information in this respect because of the difficulty of determining the proper classification of the employees in all emergency employments" (4).

ANALYSIS OF DATA

Year in which injury occurred. -A total of 1,337 incomplete cases in which disease is a complicating factor is available for study. These cases of different degrees of severity are classified according to the year of occurrence of injury in table 1. The partially disabled cases include 953, or 71 percent of the total, while those totally disabled include 384, or 29 percent. Considering all cases, regardless of whether the disability is partial or total, the table shows that almost 25 percent were being compensated on December 31, 1935, on account of injuries that occurred 15 or more years ago, almost 50 percent for injuries that occurred 10 or more years ago, and over 75 percent for injuries that occurred 5 or more years ago. If only the partially disabled cases are considered, over 25 percent were being com-

pensated for injuries that occurred 14 or more years ago, almost 50 percent for injuries that occurred 9 or more years ago, and over 75 percent for injuries that occurred 5 or more years ago; for the corresponding percents of the totally disabled group, the years read, 15 or more, 12 or more, and 7 or more, respectively. Approximately one-half of the totally disabled cases and one-third of the partially disabled ones, respectively, were being compensated for injuries that occurred 12 or more years ago.

TABLE 1.—*Distribution of incomplete cases in which disease is a complicating factor according to year of occurrence of injury, as of Dec. 31, 1935*

Year of injury	Number of years elapsing since year of injury	All cases			Partial disability			Total disability		
		Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
Total		1,337	100.0		953	100.0		384	100.0	
Before 1916	More than 19	4	0.3	0.3	0	0	0	4	1.0	1.0
1916	19	5	.4	.7	3	.3	.3	2	.5	1.5
1917	18	29	2.2	2.9	18	1.9	2.2	11	2.9	4.4
1918	17	74	5.5	8.4	51	5.3	7.5	23	6.0	10.4
1919	16	96	7.2	15.6	62	6.5	14.0	34	8.9	19.3
1920	15	89	6.6	22.2	54	5.7	19.7	35	9.1	28.4
1921	14	77	5.8	28.0	51	5.4	25.1	26	6.8	35.2
1922	13	65	4.9	32.9	38	4.0	29.1	27	7.0	42.2
1923	12	55	4.1	37.0	32	3.4	32.5	23	6.0	48.2
1924	11	65	4.9	41.9	44	4.6	37.1	21	5.5	53.7
1925	10	75	5.6	47.5	54	5.7	42.8	21	5.5	59.2
1926	9	76	5.7	53.2	52	5.5	48.3	24	6.2	65.4
1927	8	68	5.1	58.3	48	5.0	53.3	20	5.2	70.6
1928	7	80	6.0	64.3	58	6.1	59.4	22	5.7	76.3
1929	6	110	8.2	72.5	84	8.8	68.2	26	6.8	83.1
1930	5	89	6.6	79.1	68	7.1	75.3	21	5.5	88.6
1931	4	91	6.8	85.9	69	7.2	82.5	22	5.7	94.3
1932	3	77	5.8	91.7	67	7.0	89.5	10	2.6	96.9
1933	2	71	5.3	97.0	62	6.5	96.0	9	2.3	99.2
1934	1	39	2.9	99.9	36	3.8	99.8	3	.8	100.0
1935	Less than 1	2	.1	100.0	2	.2	100.0	0	0	100.0

Nature of injury.—The distribution of the incomplete cases according to the nature of the injury is given in table 2. Fractures, sprains and strains, and bruises, accounting, respectively, for 38, 16, and 12 percent of all the cases, are the most important of the injuries in this experience, the same order holding for the partially disabled as well as the totally disabled ones. The magnitudes of the corresponding percentages for sprains and strains and for bruises are similar for the two degrees of disability. The percentage for fractures, on the other hand, is approximately 50 percent greater in the group with partial disability.

TABLE 2.—*Distribution of incomplete cases in which disease is a complicating factor according to nature of injury, as of Dec. 31, 1935*

Nature of injury	All cases		Partial disability		Total disability	
	Number	Percent	Number	Percent	Number	Percent
Total	1,337	100.0	953	100.0	384	100.0
Fracture	507	37.9	398	41.7	109	28.4
Sprain, strain	207	15.5	155	16.2	52	13.5
Bruise, contusion, abrasion, blister	162	12.1	113	11.9	49	12.8
Cut, laceration	74	5.5	70	7.3	4	1.0
Puncture	56	4.2	42	4.4	14	3.6
Burn, scald	28	2.1	17	1.8	11	2.9
Concussion	28	2.1	12	1.3	16	4.2
Amputation	17	1.3	16	1.7	1	.3
Dislocation	14	1.0	13	1.4	1	.3
Miscellaneous [1]	244	18.3	117	12.3	127	33.0

[1] Includes 100 cases associated with tuberculosis (all forms), 23 with the eye, and 22 with general infectious.

Anatomical location of injury.—In table 3 the cases are classified according to the anatomical location of the injury. Considering all cases, the percents confined to the trunk, lower extremities, head, and upper extremities are, respectively, 30, 28, 18, and 11. The percentages for the trunk and head are considerably greater for the totally disabled cases than the corresponding ones for the partially disabled; in the first instance the percentage is 50 percent greater, while in the second instance the figure is more than doubled. The percentages for both extremities are greater for the partially disabled, the lower extremities yielding a figure more than twice as large and the upper extremities yielding one three times as large. However, it is of interest to note that the trunk and lower extremities taken together represent more than one-half of the cases in each class of disability.

TABLE 3.—*Distribution of incomplete cases in which disease is a complicating factor according to anatomical region affected, as of Dec. 31, 1935*

Anatomical region affected	All cases		Partial disability		Total disability	
	Number	Percent	Number	Percent	Number	Percent
Total	1,337	100.0	953	100.0	384	100.0
Trunk	399	29.9	240	26.1	150	39.1
Lower extremities	377	28.2	319	33.5	58	15.1
Head	238	17.8	128	13.4	110	28.6
Upper extremities	153	11.4	135	14.2	18	4.7
Hand	111	8.3	103	10.8	8	2.1
Multiple regions	37	2.8	10	1.1	27	7.0
Face and neck	4	.3	2	.2	2	.5
Miscellaneous	18	1.3	7	.7	11	2.9

Duration of cases and compensation paid according to complicating agent.—The Federal compensation law dealing with civil employees, unlike many other laws relating to the compensation of workmen, does not limit the payment of compensation for permanent partial disability to a scheduled period of weeks or the aggregate amount of

compensation payable for either partial or total disability. In general, compensation for total disability is payable monthly during the period of disability and is equal to two-thirds of the employee's monthly pay. Compensation for partial disability is payable so long as the disability causes a loss in wage-earning capacity, the payable monthly compensation being equal to two-thirds of the difference between the employee's monthly pay and his monthly wage-earning capacity after the beginning of partial disability (5). The employee, then, is compensated in part for economic loss and not for physical impairment. A case, however, may be reopened if it later involves loss in earning capacity (6).[2]

Each of the 1,337 cases was designated by the Commission as being in one of 7 principal categories. The number of the cases and the corresponding percent associated with each category have been calculated with results as shown in the following tabulation:

	Number	*Percent*
Total	1, 337	100. 0
Diseases resulting from accidental injuries	825	61. 8
Diseases activated or aggravated by accidental injuries	293	21. 9
Infectious diseases	75	5. 6
Hernias	68	5. 1
Fatigue, strain, posture, lighting	30	2. 2
Temperature, moisture, air pressure	30	2. 2
Dusts, gases, chemicals	16	1. 2

The tabulation shows that a relatively low percentage of the total number of cases of the present experience involves what may be designated occupational diseases. This particular percent is 11.2[3] and includes infectious diseases and cases associated with fatigue, strain, posture, and lighting; temperature, moisture, and air pressure; and dusts, gases, and chemicals. Cases resulting from accidental injuries and activated or aggravated by accidental injuries include 83.7 percent of the total. Following the suggestion of various industrial hygienists (7) the hernias are kept separate and the tabulation shows that they accounted for 5.1 percent of all cases.[4] Many of the diseases, for example, tuberculosis, arthritis, and psychosis, were necessarily included by the Commission in more than one of the seven categories. These diseases have been, respectively, combined for present purposes.

Table 4 shows the duration of the cases and the compensation paid, classified according to the complicating disease, symptom, or other

[2] In connection with this paragraph see a comprehensive table, "Minimum and maximum benefits under workmen's compensation laws by extent of disability and by States", Handbook of Labor Statistics, Government Printing Office, Washington, D. C., 1936 (Bulletin No. 616 of the Bureau of Labor Statistics, pp. 1126–27.)

[3] This percentage, obviously, would be appreciably smaller if the present experience had included the incomplete cases not associated with disease.

[4] The classification of cases into those involving accidental injuries, occupational diseases, and hernias is of particular interest at the present time. Comparative analyses based on this classification will appear in some detail in a subsequent paper.

agent. The total duration of all cases amounts to nearly 2.7 million days and is approximately equally divided between the two groups of severity. The total compensation paid is over 7 million dollars, with 54 percent representing the cases with partial disability. Regardless of the degree of disability, arthritis as a complicating factor easily ranks first with respect to the number of cases, duration, and compensation paid. This disease was associated with 24 percent of all the cases, with 22 percent of the total duration of all cases, and with 21 percent of the total compensation paid for all cases. General infections and tuberculosis rank next in importance. In the group of partially disabled cases, bone infections supplant tuberculosis with percents for cases, duration, and compensation reading, respectively, 9, 11, and 10. In the group of totally disabled cases, tuberculosis assumes the place previously occupied by general infections, and neuroses appear in the third position with respect to duration and compensation, the percents being 9 in each instance.

TABLE 4.—*Duration of incomplete cases and compensation paid, classified according to the complicating disease, symptom, or other agent, as of Dec. 31, 1935*

Complicating disease, symptom, or other agent	Cases		Duration in days to Dec. 31, 1935		Compensation to Dec. 31, 1935			
	Number	Percent	Number	Percent	Amount	Percent	Average per case	Average per case divided by average for all cases
	All cases							
Total	1,337	100.0	2,685,584	100.0	$7,143,884	100.0	$5,343	1.0
Arthritis	318	23.8	585,755	21.8	1,507,236	21.1	4,740	.9
General infection	154	11.5	209,629	10.0	707,681	9.9	4,595	.9
Tuberculosis, all forms	128	9.6	311,048	11.6	875,505	12.3	6,840	1.3
Eye	105	7.8	170,729	6.4	442,325	6.2	4,213	.8
Bone infection	98	7.3	199,895	7.5	521,586	7.3	5,322	1.0
Neurosis	88	6.6	218,228	8.1	602,337	8.4	6,845	1.3
Hernia	68	5.1	147,185	5.5	385,528	5.4	5,670	1.1
Venereal disease	59	4.4	95,848	3.6	241,404	3.4	4,093	.8
Gangrene, cellulitis	40	3.0	64,716	2.4	155,905	2.2	3,898	.7
Previous injury	37	2.8	73,664	2.8	205,802	2.9	5,562	1.0
Hemiplegia	27	2.0	73,526	2.7	191,178	2.7	7,081	1.3
Psychosis	25	1.9	74,375	2.8	202,825	2.8	8,113	1.5
Bursitis, synovitis	19	1.4	30,670	1.1	82,381	1.2	4,336	.8
Varicose veins	13	1.0	40,517	1.5	102,172	1.4	7,859	1.5
Spondylitis	9	.7	13,634	.5	39,016	.5	4,335	.8
Heart disease	8	.6	21,548	.8	58,736	.8	7,342	1.4
General paralysis	7	.5	17,345	.6	47,635	.7	6,805	1.3
Neoplasm	5	.4	16,953	.6	46,931	.7	9,386	1.8
Lead	5	.4	14,668	.5	41,856	.6	8,371	1.6
Miscellaneous [1]	35	2.6	74,990	2.8	203,563	2.8	5,816	1.1
Diseases, n. o. c.	89	6.6	170,661	6.4	482,222	6.7	5,418	1.0

See footnotes at end of table.

TABLE 4.—*Duration of incomplete cases and compensation paid, classified according to the complicating disease, symptom, or other agent, as of Dec. 31, 1935*—Contd.

Complicating disease, symptom, or other agent	Cases		Duration in days to Dec. 31, 1935		Compensation to Dec. 31, 1935			
	Number	Percent	Number	Percent	Amount	Percent	Average per case	Average per case divided by average for all cases
	Partial disability							
Total	953	100.0	1,383,623	100.0	$3,822,558	100.0	$4,011	0.8
Arthritis	248	26.0	334,740	24.2	912,302	23.9	3,679	.7
General infection	143	15.0	233,623	16.9	620,163	16.2	4,337	.8
Tuberculosis, all forms	65	6.8	106,836	7.7	302,532	7.9	4,654	.9
Eye	72	7.6	62,006	4.5	178,601	4.7	2,481	.5
Bone infection	84	8.8	149,866	10.8	392,914	10.3	4,678	.9
Neurosis	57	6.0	103,584	7.5	296,847	7.7	5,208	1.0
Hernia	46	4.8	55,196	4.0	161,958	4.2	3,521	.7
Venereal disease	48	5.1	62,136	4.5	155,630	4.1	3,242	.6
Gangrene, cellulitis	37	3.9	56,639	4.1	132,531	3.5	3,582	.7
Previous injury	24	2.5	33,233	2.4	98,044	2.6	4,085	.8
Hemiplegia	11	1.2	14,769	1.1	50,633	1.3	4,603	.9
Psychosis	4	.4	6,449	.5	24,956	.6	[2] 6,239	1.2
Bursitis, synovitis	18	1.9	24,714	1.8	71,354	1.9	3,964	.7
Varicose veins	7	.7	16,003	1.1	44,209	1.1	6,316	1.2
Spondylitis	7	.7	10,129	.7	31,147	.8	4,450	.8
Heart disease	3	.3	4,312	.3	11,404	.3	[2] 3,801	.7
General paralysis	0	0	0	0	0	0	0	0
Neoplasm	2	.2	3,601	.3	10,171	.3	[2] 5,086	1.0
Lead	3	.3	3,937	.3	16,068	.4	[2] 5,356	1.0
Miscellaneous [1]	17	1.8	23,778	1.7	67,726	1.8	3,984	.7
Diseases, n. o. c.	57	6.0	78,072	5.6	243,368	6.4	4,270	.8
	Total disability							
Total	384	100.0	1,301,961	100.0	$3,321,326	100.0	$8,649	1.6
Arthritis	70	18.2	251,015	19.3	594,934	17.9	8,499	1.6
General infection	11	2.9	36,006	2.8	87,518	2.6	7,956	1.5
Tuberculosis, all forms	63	16.4	204,212	15.7	572,973	17.3	9,095	1.7
Eye	33	8.6	108,723	8.4	263,724	7.9	7,992	1.5
Bone infection	14	3.6	50,029	3.8	128,672	3.9	9,191	1.7
Neurosis	31	8.1	114,644	8.8	305,490	9.2	9,855	1.8
Hernia	22	5.7	91,989	7.1	223,570	6.7	10,162	1.9
Venereal disease	11	2.9	33,712	2.6	85,834	2.6	7,803	1.5
Gangrene, cellulitis	3	.8	8,077	.6	23,374	.7	[2] 7,791	1.5
Previous injury	13	3.4	40,431	3.1	107,758	3.3	8,289	1.6
Hemiplegia	16	4.2	58,757	4.5	140,545	4.2	8,784	1.6
Psychosis	21	5.5	67,926	5.2	177,869	5.4	8,470	1.6
Bursitis, synovitis	1	.2	5,956	.5	11,027	.3	[2] 11,027	2.1
Varicose veins	6	1.6	24,514	1.9	57,963	1.8	9,660	1.8
Spondylitis	2	.5	3,505	.3	7,869	.2	[2] 3,934	.7
Heart disease	5	1.3	17,236	1.3	47,332	1.4	9,466	1.8
General paralysis	7	1.8	17,345	1.3	47,635	1.4	6,805	1.3
Neoplasm	3	.8	13,352	1.0	36,760	1.1	[2] 12,253	2.3
Lead	2	.5	10,731	.8	25,788	.8	[2] 12,894	2.4
Miscellaneous [1]	18	4.7	51,212	3.9	135,837	4.1	7,546	1.4
Diseases, n. o. c.	32	8.3	92,589	7.1	238,854	7.2	7,464	1.4

[1] Includes fewer than 5 cases associated with each of the following: Poisons, n. o. c.; dusts, gases, chemicals, n. o. c.; dermatitis, n. o. c.; pneumonia; sunstroke, heat exhaustion; frostbite, freezing; caisson disease; neuritis; fatigue, n. o. c.; laboratory infection; diseases following prophylactic treatment; diabetes; endarteritis gangrene; nephritis; ganglion; neurasthenia; orchitis, epididymitis; and peritonitis. N. o. c.=not otherwise classified.

[2] Based on fewer than 5 cases.

Table 4 also gives the average compensation paid per case for each disease or other associated agent, and the ratio of this average to the average compensation paid for all 1,337 cases. The average compensation per case, considering all cases, was $5,313. The average paid for partial disability cases was $4,011 while the average paid for cases with total disability was more than twice this amount, namely, $8,649. In the partial disability group the highest average, $6,316, was paid for cases associated with varicose veins; this average, when averages based on fewer than 5 cases are disregarded, was followed by $5,208 for neuroses. The lowest average, $2,481, was paid for eye cases. Again disregarding averages based on fewer than 5 cases, hernias led in the total disability group with an average of $10,162, followed by neuroses with $9,855. In this group the lowest average, $6,805, was for cases with general paralysis. It will be seen that the highest average yielded by the cases with partial disability is lower than the lowest average yielded by the cases with total disability, and that the neuroses ranked second in either group of disability.

With regard to the ratio of the average compensation paid per case to the average for all cases (table 4), it is sufficient to say that the ratios for the partially disabled cases are generally less than 1 while the ratios for the totally disabled ones are well over 1. In other words, the average compensation paid per case with partial disability and specific for agent was generally less than the average for all cases regardless of degree of disability and agent; further, the average compensation per case with total disability and specific for agent was from 0.3 to 0.9 greater than the average compensation paid for all cases regardless of disability and agent.

Duration of cases, compensation paid, and estimated future cost, by year of occurrence of injury.—The duration of cases and compensation paid have been reclassified and are shown in table 5 according to year of occurrence of injury. In addition to data concerning these items, the future cost of each case as estimated by the Commission was made available. These data have been reduced and the results have been made a part of table 5.

TABLE 5.—*Duration of incomplete cases, compensation paid, and estimated future cost according to year of occurrence of injury, as of Dec. 31, 1935*

Year of injury	Number of cases	Duration in days to Dec. 31, 1935		Compensation to Dec. 31, 1935		Estimated future cost	
		Number	Percent	Amount	Percent	Amount	Percent
	All cases						
Total	1,337	2,685,584	100.0	$7,143,884	100.0	$8,221,841	100.0
Before 1916	4	9,601	.4	19,748	.3	37,209	.4
1916	5	10,948	.4	24,002	.3	20,366	.2
1917	20	81,355	3.0	180,783	2.5	111,341	1.4
1918	74	236,919	8.8	599,237	8.4	473,069	5.7
1919	96	318,317	11.8	808,454	11.3	572,713	7.0
1920	89	290,519	10.8	762,304	10.7	547,106	6.7
1921	77	218,069	8.1	570,775	8.0	440,906	5.4
1922	65	185,194	6.9	459,029	6.4	438,326	5.3
1923	55	153,348	5.7	402,434	5.6	428,992	5.2
1924	65	147,129	5.5	398,649	5.6	390,586	4.7
1925	75	155,241	5.8	422,766	5.9	465,804	5.7
1926	76	140,404	5.6	445,749	6.2	508,812	6.2
1927	68	117,602	4.4	335,205	4.7	457,208	5.6
1928	80	145,154	5.4	404,811	5.7	559,370	6.8
1929	110	142,870	5.3	420,079	5.9	656,826	8.0
1930	89	107,482	4.0	308,221	4.3	570,629	6.9
1931	91	91,087	3.4	245,143	3.4	549,445	6.7
1932	77	63,236	2.4	174,067	2.5	359,517	4.4
1933	71	42,678	1.6	111,414	1.6	400,072	4.9
1934	39	18,891	.7	48,981	.7	225,149	2.7
1935	2	537	(1)	2,038	(1)	8,400	.1
	Partial disability						
Total	952	1,383,623	100.0	$3,822,558	100.0	$3,030,865	100.0
Before 1916	0	0	0	0	0	0	0
1916	3	5,896	.4	12,581	.3	4,689	.2
1917	18	31,130	2.2	70,692	1.8	36,601	1.2
1918	51	111,201	8.0	283,795	7.4	203,195	6.7
1919	62	159,077	11.5	419,446	11.0	191,302	6.3
1920	54	121,848	8.8	339,262	8.9	166,991	5.5
1921	51	105,052	7.6	307,329	8.0	173,260	5.7
1922	38	69,400	5.0	179,956	4.7	116,655	3.9
1923	32	66,478	4.8	186,221	4.9	115,561	3.8
1924	44	70,527	5.1	211,232	5.5	166,546	5.5
1925	54	92,537	6.7	252,590	6.6	185,313	6.1
1926	52	80,466	5.8	243,651	6.4	152,720	5.0
1927	48	67,120	4.9	187,087	4.9	164,663	5.4
1928	58	89,909	6.5	247,564	6.5	188,839	6.2
1929	84	88,195	6.4	264,193	6.9	240,078	7.9
1930	68	66,112	4.8	196,529	5.1	189,920	6.3
1931	60	56,035	4.1	145,493	3.8	186,203	6.2
1932	67	50,648	3.7	139,548	3.7	183,497	6.1
1933	62	34,382	2.5	88,877	2.3	194,840	6.4
1934	36	17,073	1.2	44,479	1.2	161,592	5.3
1935	2	537	(1)	2,033	.1	8,400	.3
	Total disability						
Total	384	1,301,961	100.0	$3,321,326	100.0	$5,190,976	100.0
Before 1916	4	9,604	.7	19,748	.6	37,209	.7
1916	2	5,052	.4	11,421	.4	15,677	.3
1917	11	50,225	3.9	110,091	3.3	74,740	1.4
1918	23	125,718	9.7	315,442	9.5	269,874	5.2
1919	34	159,240	12.2	389,008	11.7	381,411	7.4
1920	35	168,671	12.9	423,042	12.7	380,115	7.3
1921	26	113,017	8.7	263,446	7.9	267,646	5.2
1922	27	115,794	8.9	279,073	8.4	321,671	6.2
1923	23	86,870	6.7	216,213	6.5	313,431	6.0
1924	21	76,602	5.9	187,417	5.7	224,040	4.3
1925	21	62,704	4.8	170,176	5.1	280,491	5.4
1926	24	68,938	5.3	202,098	6.1	356,092	6.9
1927	20	50,482	3.9	148,118	4.5	292,540	5.6
1928	22	55,245	4.2	157,247	4.7	370,581	7.2
1929	26	54,675	4.2	155,886	4.7	416,748	8.0
1930	21	41,370	3.2	111,692	3.4	380,709	7.3
1931	22	35,052	2.7	99,650	3.0	363,242	7.0
1932	10	12,588	1.0	34,519	1.0	176,020	3.4
1933	9	8,296	.6	22,537	.7	205,232	4.0
1934	3	1,818	.1	4,502	.1	63,557	1.2
1935	0	0	0	0	0	0	0

1 Less than 0.1 of 1 percent.

A number of interesting facts are disclosed by the table. While the partial disability cases are almost two and one-half times as many as those with total disability, their total durations and total paid compensation, respectively, are similar in magnitude. The estimated future cost of the total disability cases, however, is almost 75 percent greater than the future cost estimated for the cases with partial disability. With respect to the cases with partial disability almost one-half of the total duration and one-half of the total compensation paid, respectively, are accounted for by injuries that occurred 12 or more years ago; the corresponding time for the cases with total disability is 14 or more years.

TABLE 6.—*Compensation paid for each case per day of duration, as of Dec. 31, 1935*

Class interval in dollars	Number			Percent		
	All cases	Partial disability	Total disability	All cases	Partial disability	Total disability
Total	1,337	953	384	100.0	100.0	100.0
0.35–0.59	1	1	0	.1	.1	0
0.60–0.84	7	5	2	.5	.5	.5
0.85–1.09	5	4	1	.4	.4	.3
1.10–1.34	14	12	2	1.1	1.3	.5
1.35–1.59	18	11	7	1.4	1.2	1.8
1.60–1.84	54	29	25	4.0	3.0	6.5
1.85–2.09	147	107	40	11.0	11.2	10.4
2.10–2.34	250	179	71	18.7	18.8	18.5
2.35–2.59	149	98	51	11.1	10.3	13.3
2.60–2.84	167	121	46	12.5	12.7	12.0
2.85–3.09	118	81	37	8.8	8.5	9.6
3.10–3.34	107	69	38	8.0	7.3	9.9
3.35–3.59	72	53	19	5.4	5.6	5.0
3.60–3.84	94	61	33	7.0	6.4	8.6
3.85–4.09	51	44	7	3.8	4.6	1.8
4.10–4.34	29	27	2	2.2	2.8	.5
4.35–4.59	44	41	3	3.3	4.3	.8
4.60–4.84	3	3	0	.2	.3	0
4.85–5.09	2	2	0	.1	.2	0
5.10–5.34	4	4	0	.3	.4	0
6.85–7.09	1	1	0	.1	.1	0
Mean	$2.759 ±.015	$2.802 ±.018	$2.651 ±.023			
Standard deviation	$0.787 ±.010	$0.825 ±.013	$0.671 ±.016			

Average compensation per day of duration for each case.—The compensation for each case per day of duration has been calculated and the results are shown in the form of frequency distributions in table 6. The average daily compensations for all cases, cases with partial disability, and cases with total disability range, respectively, from $0.40 to $5.33, with one case at $7.09; from $0.40 to $5.33, with one case at $7.09; and from $0.78 to $4.46. The means are, respectively, $2.76, $2.80, and $2.65, and the standard deviations $0.79, $0.83, and $0.67. When the frequency distributions are plotted on ordinary cross-section paper [5] they show a rapid rise over six or seven class intervals to the interval $2.10–$2.35; thereafter there is a slow decline.

[5] The graphs are omitted.

The distributions for all cases and the partially disabled ones show the decline over 12 class intervals; the distribution for the totally disabled cases shows the decline over 9 class intervals. The distributions are, therefore, skew and the mode in each instance is to the left of the mean. The shapes of the distributions for the partial and total disability cases appear in general to be similar, and calculations show that the two distributions together with the distribution for all cases may be represented probably by the same type of Pearsonian frequency curve.[6] A probability test, however, shows what was expected to be disclosed by an inspection of the graphs of the distributions, namely, that partial and total disability select differently with respect to compensation per day of duration for each case.[7]

In the preceding discussion average daily rates were computed for calendar days of duration. In connection with rates computed for compensated days, Secretary McCauley of the Commission states in a personal communication that "The maximum compensation rate in the case of a person employed 6 days per week is a per-diem wage of $4.47 and in the case of a 5-day week $5.36. The minimum per-diem rates are, respectively, $2.24 and $2.68."

SUMMARY

This paper deals with the duration and cost of incomplete cases in which disease is a complicating factor occurring among civil employees of the United States Government. The cases are incomplete in the sense that they were still being compensated on December 31, 1935.

The Federal act providing for this compensation was established in 1916 and has been administered by the United States Employees' Compensation Commission. The estimated number of employees within the scope of the act for a period approximately 15 years prior to 1933 did not exceed 700,000. Since 1933 the number has increased to between 900,000 and 1,000,000.

The paper may be conveniently summarized as follows:

(1) Of the 1,337 incomplete cases, 84 percent resulted from accidental injuries or were activated or aggravated by them. About 11 percent of the total cases involved what may be designated occupational diseases. About 5 percent of the total cases were accounted for by hernias.

(2) Of the 1,337 incomplete cases, 71 percent were partially disabled; the remainder were totally disabled.

(3) Almost 50 percent of all cases were compensated for injuries that occurred 10 or more years ago.

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[6] Distribution:

	β_1	β_2
All cases	0.2938 ± 0.0460	3.1024 ± 0.1242
Partial disability	0.3060 ± 0.0673	3.3619 ± 0.2106
Total disability	0.0596 ± 0.0279	2.6923 ± 0.1201

[7] The chi square yields a P of less than 0.0003.

(4) Fractures, sprains and strains, and bruises accounted, respectively, for 38, 16, and 12 percent of all cases.

(5) The percents of all cases confined to the trunk, lower extremities, head, and upper extremities were, respectively, 30, 28, 18, and 11.

(6) The total duration of all cases amounted to nearly 2.7 million days and was approximately equally divided between the partially and totally disabled groups.

(7) The total compensation paid was over 7 million dollars, with 54 percent representing the cases with partial disability. The average compensation paid per case was $5,343. The estimated future cost of the 1,337 cases is over 8 million dollars.

(8) Regardless of the degree of disability, arthritis as a complicating factor easily ranked first with respect to the number of cases, total duration, and total compensation paid. This disease was associated with 24 percent of all the cases, with 22 percent of the total duration of all cases, and with 21 percent of the total compensation paid for all cases. General infections and tuberculosis ranked next in importance as complicating factors.

(9) Regardless of the complicating disease, symptom, or other agent and the degree of disability, the average compensation per calendar day of duration per case was $2.76. With respect to rates computed for compensated days, the maximum compensation rate in the case of a person employed 6 days per week is a per-diem wage of $4.47 and in the case of a 5-day week $5.36. The minimum per-diem rates are, respectively, $2.24 and $2.68.

ACKNOWLEDGMENTS

The author is indebted to Chairman Jewell W. Swofford, of the United States Employees' Compensation Commission, for making possible the preparation of this paper; to Dr. F. M. Phillips for providing the basic data; and to Secretary William McCauley for helpful interpretations.

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(3) Idem: (1926) Tenth Annual Report, July 1, 1925, to June 30, 1926. P. 1.
(4) Idem: (1936) Nineteenth Annual Report, July 1, 1934, to June 30, 1935. P. 3.
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(6) Idem: (1932) Sixteenth Annual Report, July 1, 1931, to June 30, 1932. Pp. 12, 15.
(7) Committee on Research and Standards, American Public Health Association: [1931] Report of Committee on Standard Practices in the Problem of Compensation of Occupational Diseases. (Short title: Occupational Disease Legislation.) Published for the American Public Health Association by the Chemical Foundation. N. p. P. 92.

ORNITHODOROS TURICATA: THE POSSIBLE VECTOR OF RELAPSING FEVER IN SOUTHWESTERN KANSAS

Preliminary Report [1]

By GORDON E. DAVIS, *Bacteriologist, United States Public Health Service*

Dr. Harold O. Closson has reported 11 cases of relapsing fever as having occurred in Clarke County, Kans., 1931–34 (*1*). Other cases have been reported subsequently from this and nearby counties. There has been no information as to the possible vector.

In late August and early September 1936 the writer and two assistants were detailed from the Rocky Mountain Laboratory for local studies as to the transmitting agent. Approximately 2,000 specimens of *Ornithodoros turicata,* hitherto not known to occur in Kansas, were recovered in Clarke County. The various stages of this tick were found in rodent burrows, in holes in sand, and attached to cottontail rabbits, one immature jack rabbit, spermophiles, prairie dogs, prairie-dog owls, and terrapins. Eleven hundred and ninety-seven ticks were removed from a single sand hole which contained 11 terrapins (*Terrapene ornata*). These ticks were later tested for spirochetes at the Rocky Mountain Laboratory by permitting them to engorge on white rats. Three strains of spirochetes were recovered from three localities, viz, from ticks collected from a prairie-dog burrow in the south central part of Clarke County, from a sand hole (no host present) in the extreme eastern part, and from a cottontail rabbit burrow in the face of a limestone outcropping in the extreme western part. The prairie-dog burrow was located on a ranch where a case of relapsing fever had occurred.

From the above data it seems reasonable to believe that *O. turicata* may be implicated in relapsing fever transmission in this area.

REFERENCE

(1) 1934. The Journal of the Kansas Medical Society, vol. 35, no. 2.

WHAT IS HAPPENING IN COUNTY HEALTH DEPARTMENTS?

The question as to what is happening in county health departments has been answered by the United States Public Health Service in an analysis of the annual reports on budget and personnel of every county health department that was in operation at any time during the years 1908–34, inclusive.[2] These data were used to define the period of operation and to depict the growth or retrogression that occurred.

[1] Contribution from the Rocky Mountain Laboratory, United States Public Health Service, Hamilton' Mont. Manuscript submitted for publication Nov. 14, 1936.

[2] Experience of the health department in 811 counties, 1908–34. By Joseph W. Mountin, Elliott H. Pennell, and E. Evelyn Flook. Public Health Bulletin No. 230, Government Printing Office, Washington, D. C., 1936.

Kentucky was the first State to report the existence of a county health department which satisfied the definition used in this bulletin; namely, a county-wide public health service under the direction of a full-time professional health officer. This development occurred during 1908 in Jefferson County, a suburban county surrounding Louisville. Three years later, two services of this general type for rural areas began almost simultaneously in Yakima County, Wash., and in Guilford County, N. C. From these three foci the movement spread to practically all parts of the United States. In all, 811 counties maintained health department service for some period during the years from 1908 through 1934.

The county health department movement did not progress evenly when considered from the standpoint of either chronology or location. Comparatively few counties elected this type of service until after the close of the World War. From that time on to 1932 there was a continuous increase in the number, with distinct acceleration in the rate of growth during 1920-21, 1927-28, and 1931. In 1932 more counties terminated than established services. This reversal in trend continued through 1933, but growth was resumed in 1934.

About 68 percent of the counties which operated health department service are located in the Southern States. The lowest percentages of counties with service so organized are to be found in the West, North Central, and Middle Atlantic States. At the close of the study period Delaware and Maryland were in the honor roll with all counties maintaining full-time health service. In several States the percentage was well over 50. All county health departments did not survive; 270 ceased to operate before the close of 1934. Of this number, 40 reestablished the service, which was in operation at the close of the period.

By comparing the size of staff during the last year of operation with the size during the first year, it was found that one-half of the staffs increased in size and the others remained static or receded. The showing was somewhat better, though not strikingly so, when the size of staff on the year of maximum budget was compared with that on the first and the last year of health department service.

For several years following the establishment of the first county health department, the service was supported with funds derived from local sources. Later the States became important contributors, in some places taking over all or a major part of the burden. Generally speaking, the States in granting aid have favored the counties least able to support the service. The Federal Government and several nonofficial agencies have made important financial contributions, but the amount given in different years fluctuated over a wide range. Presumably funds were granted for the purpose of initiating the work, but with the expectation that in following years responsibility for

financial support would be transferred to State and local official agencies.

Certain combinations of circumstances seem to favor the establishment and growth of county health departments. Under other conditions, this form of organization has not prospered. The many factors which seem to influence the behavior of counties in this regard are considered in the report.

This bulletin should be of interest and value to all health workers, but especially to those who are charged with responsibility for providing modern public health service in those areas where the county may be utilized as an administrative unit.

DEATHS DURING WEEK ENDED NOVEMBER 21, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov 21, 1936	Corresponding week, 1935
Data from 86 large cities of the United States		
Total deaths	8,208	8,022
Deaths per 1,000 population, annual basis	11.5	11.2
Deaths under 1 year of age	490	519
Deaths under 1 year of age per 1,000 estimated live births	44	48
Deaths per 1,000 population, annual basis, first 47 weeks of year	12.0	11.3
Data from industrial insurance companies		
Policies in force	68,670,288	67,760,086
Number of death claims	13,263	13,071
Death claims per 1,000 policies in force, annual rate	10.1	10.1
Death claims per 1,000 policies, first 47 weeks of year, annual rate	9.8	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 28, 1936, and November 30, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 28, 1936, and Nov. 30, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935
New England States:								
Maine	2	1	9		11	74	0	1
New Hampshire	8				1	2	0	0
Vermont					1	35	0	0
Massachusetts	5	12			158	60	3	1
Rhode Island	8				94	14	0	0
Connecticut	1	4	1	18	43	29	0	2
Middle Atlantic States:								
New York	27	42	[1] 11	[1] 14	120	397	12	6
New Jersey	18	21	14	7	81	12	2	0
Pennsylvania	36	35			87	48	3	2
East North Central States:								
Ohio	41	89	28	70	12	65	20	0
Indiana	19	47	8	35	7	12	1	4
Illinois	86	61	9	16	13	12	5	0
Michigan	36	30	2	2	31	16	4	2
Wisconsin	3	4	12	34	20	57	2	2
West North Central States:								
Minnesota	12	7	1	1	7	40	2	1
Iowa		18	1	7	5	5	0	3
Missouri	28	75	90	95	6	26	7	3
North Dakota	1		50			12	0	0
South Dakota	1				3	3	0	0
Nebraska	4	7		1	1	9	0	2
Kansas	11	15	1	16	5	8	2	1
South Atlantic States:								
Delaware	2	1			2	82	0	0
Maryland [2]	16	13	9	3	75	15	3	5
District of Columbia	14	22	1		2	1	0	3
Virginia	55	49			34	11	8	0
West Virginia	20	49	20	25		9	5	0
North Carolina [3]	100	60	12	6	41	9	4	1
South Carolina [3]	21	4	213	102	17	1	4	0
Georgia [3]	39	22		19			0	2
Florida	9	10	3	6			0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 28, 1936, and Nov. 30, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935
East South Central States:								
Kentucky	11	30	17	9	4	31	8	1
Tennessee [3]	43	57	63	34	7	2	2	6
Alabama [3]	44	34	104	53	1	6	2	2
Mississippi [2]	12	9					0	0
West South Central States:								
Arkansas	4	17	18	51			0	1
Louisiana [3]	12	34	16	11	3	11	1	0
Oklahoma [4]	15	20	66	99	7		3	0
Texas [3]	62	155	109	218	25	5	1	3
Mountain States:								
Montana	1	1	3	6	4	16	1	1
Idaho	5	1	4	1	63	6	3	0
Wyoming		3			1	2	0	0
Colorado	10	11			6	10	0	1
New Mexico	3	2	1	3	31	1	0	0
Arizona	8	6	56	54		1	0	0
Utah [2]		2			8	1	0	0
Pacific States:								
Washington		4	3		11	125	2	6
Oregon			30	24	11	230	2	2
California	59	52	65	23	26	127	6	2
Total	852	1,142	1,050	1,123	985	1,647	124	80
8 weeks of year	25,748	34,173	149,838	112,880	277,990	711,070	6,987	5,155

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935
New England States:								
Maine	1	1	18	18	0	0	0	2
New Hampshire	0	1	14	16	0	0	0	0
Vermont	0	0	9	9	0	0	0	2
Massachusetts	0	5	144	167	0	0	1	2
Rhode Island	0	3	25	18	0	0	2	0
Connecticut	0	5	32	32	0	0	2	0
Middle Atlantic States:								
New York	3	17	310	470	0	0	9	9
New Jersey	0	6	74	97	0	0	4	4
Pennsylvania	7	2	296	233	0	0	16	8
East North Central States:								
Ohio	9	0	343	444	2	1	15	8
Indiana	3	0	80	160	1	5	0	4
Illinois	8	6	312	464	0	2	14	8
Michigan	2	1	191	201	0	0	4	3
Wisconsin	0	0	232	427	5	9	2	2
West North Central States:								
Minnesota	1	1	176	266	1	1	0	0
Iowa	4	0	71	107	5	3	1	28
Missouri	2	2	94	141	6	1	19	2
North Dakota	0	0	85	37	16	0	1	1
South Dakota	0	0	45	57	1	6	1	0
Nebraska	0	0	51	133	4	52	0	2
Kansas	2	1	161	96	12	5	3	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 28, 1936, and Nov. 30, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935	Week ended Nov. 28, 1936	Week ended Nov. 30, 1935
South Atlantic States:								
Delaware	0	1	8	11	0	0	0	1
Maryland [2]	0	6	59	104	0	0	6	13
District of Columbia	0	0	12	13	0	0	0	2
Virginia	4	2	54	47	0	0	8	4
West Virginia	1	1	52	91	0	0	9	4
North Carolina [3]	1	2	82	58	0	0	13	5
South Carolina [3]	0	2	10	7	0	0	0	2
Georgia [3]	7	0	44	28	0	0	6	8
Florida	2	0	10	7	0	0	1	0
East South Central States:								
Kentucky	2	2	34	79	0	0	8	15
Tennessee [3]	5	1	67	61	0	1	4	4
Alabama [3]	0	2	27	18	0	0	18	5
Mississippi [2]	4	3	24	19	0	0	14	7
West South Central States:								
Arkansas	1	4	7	16	1	0	4	2
Louisiana [3]	5	0	9	14	0	0	14	10
Oklahoma [4]	11	0	14	43	2	4	8	14
Texas [3]	4	0	85	76	1	1	9	27
Mountain States:								
Montana	0	1	56	107	30	41	1	0
Idaho	1	1	23	36	1	1	4	3
Wyoming	0	0	8	90	0	4	0	0
Colorado	0	0	34	189	2	6	0	0
New Mexico	0	1	16	19	0	0	2	7
Arizona	0	2	37	25	0	0	3	1
Utah [2]	0	0	20	100	0	0	0	0
Pacific States:								
Washington	2	2	50	93	0	37	1	4
Oregon	2	7	41	60	40	0	4	2
California	9	4	217	240	5	10	15	10
Total	103	95	3,896	5,259	135	190	246	238
48 weeks of year	4,292	10,500	216,314	227,148	6,823	6,685	13,857	16,739

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Nov. 28, 1936, 27 cases, as follows: North Carolina, 1; South Carolina, 1; Georgia, 15; Tennessee, 1; Alabama, 7; Louisiana, 1; Texas, 1.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1936										
Alabama	6	208	83	2,948	8	11	30	117	1	63
Colorado	5	34	--------	--------	9	--------	3	97	6	8
Kansas	--------	51	9	--------	6	1	31	332	6	11
Louisiana	4	86	52	146	7	17	2	42	0	49
Montana	8	4	72	--------	8	--------	4	244	67	19
Oklahoma [1]	6	63	241	109	16	14	34	59	10	73
Oregon	2	12	101	18	24	--------	11	102	1	16
South Dakota	1	2	7	--------	3	--------	1	143	12	9
Tennessee	8	324	146	226	8	22	84	246	2	86
Texas	8	205	402	1,973	35	12	13	134	1	107
Virginia	19	259	475	122	25	6	8	149	0	86
Washington	8	6	18	--------	30	--------	9	156	8	24

[1] Exclusive of Oklahoma City and Tulsa.

Summary of monthly reports from States—Continued

October 1936

	Cases
Chickenpox:	
Alabama	23
Colorado	76
Kansas	98
Louisiana	7
Montana	227
Oklahoma [1]	36
Oregon	80
South Dakota	28
Tennessee	58
Texas	24
Virginia	44
Washington	471
Dengue:	
Alabama	5
Dysentery:	
Alabama (amoebic)	3
Kansas (amoebic)	1
Kansas (bacillary)	1
Louisiana (amoebic)	13
Louisiana (bacillary)	3
Montana (bacillary)	25
Oklahoma [1]	54
South Dakota	3
Tennessee (amoebic)	8
Tennessee (bacillary)	33
Texas (amoebic)	2
Texas (bacillary)	9
Virginia (diarrhea included)	706
Washington (bacillary)	1
Encephalitis, epidemic or lethargic:	
Colorado	1
Kansas	2
Louisiana	1
Montana	1
Oklahoma [1]	3
Tennessee	3
Washington	5
German measles:	
Alabama	1
Kansas	5
Montana	6
Tennessee	3
Washington	21
Hookworm disease:	
Louisiana	12
Impetigo contagiosa:	
Colorado	19
Oklahoma [1]	2
Oregon	111

October 1936—Continued

	Cases
Impetigo contagiosa—Con.	
Tennessee	4
Washington	5
Mumps:	
Alabama	45
Colorado	29
Kansas	89
Louisiana	6
Montana	128
Oklahoma [1]	5
Oregon	54
Tennessee	8
Texas	48
Virginia	102
Washington	115
Ophthalmia neonatorum:	
Tennessee	1
Virginia	2
Paratyphoid fever:	
Louisiana	1
Oregon	4
Tennessee	2
Texas	3
Virginia	6
Puerperal septicemia:	
Washington	1
Rabies in animals:	
Louisiana	18
Texas	3
Washington	10
Rocky Mountain spotted fever:	
Oregon	1
Tennessee	1
Scabies:	
Colorado	7
Kansas	3
Oregon	82
Tennessee	2
Septic sore throat:	
Kansas	3
Louisiana	5
Montana	8
Oklahoma [1]	13
Oregon	6
South Dakota	1
Tennessee	11
Virginia	4
Tetanus:	
Alabama	8
Kansas	1

October 1936—Continued

	Cases
Tetanus—Continued.	
Louisiana	7
Oklahoma [1]	1
Tennessee	1
Virginia	1
Washington	1
Trachoma:	
Louisiana	1
Montana	40
Oklahoma [1]	7
Oregon	1
South Dakota	1
Tennessee	48
Trichinosis:	
South Dakota	1
Tularaemia:	
Oklahoma [1]	2
Virginia	1
Typhus fever:	
Alabama	51
Louisiana	3
Texas	43
Virginia	2
Undulant fever:	
Alabama	5
Colorado	1
Kansas	6
Louisiana	7
Oklahoma [1]	6
South Dakota	1
Tennessee	4
Texas	4
Washington	2
Vincent's infection:	
Kansas	8
Oregon	11
Tennessee	12
Whooping cough:	
Alabama	51
Colorado	162
Kansas	36
Louisiana	19
Montana	48
Oklahoma [1]	19
Oregon	85
South Dakota	8
Tennessee	54
Texas	94
Virginia	138
Washington	54

[1] Exclusive of Oklahoma City and Tulsa.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 21, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Maine:											
Portland	1	------	0	1	1	1	0	3	0	1	26
New Hampshire:											
Concord	0	------	0	0	0	1	0	0	0	1	7
Manchester	0	------	0	0	4	1	0	0	0	0	24
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	0	0	0	0	0	2
Burlington	1	------	0	2	0	0	0	0	0	0	10
Rutland	0	------	0	0	1	0	0	0	0	0	7
Massachusetts:											
Boston	1	------	1	2	17	38	0	8	0	198	207
Fall River	1	------	0	0	0	1	0	2	0	2	25
Springfield	0	------	0	0	1	3	0	0	0	0	28
Worcester	0	------	0	14	5	5	0	3	0	42	56
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	26
Providence	0	------	0	0	2	12	0	2	0	18	70
Connecticut:											
Bridgeport	0	------	0	9	2	4	0	0	0	13	21
Hartford	------	------	------	------	------	------	------	------	------	------	------
New Haven	0	------	0	2	0	1	0	0	0	2	38
New York:											
Buffalo	0	------	1	9	7	24	0	5	0	6	106
New York	25	13	3	42	97	95	0	75	4	86	1,344
Rochester	0	------	0	0	4	3	0	1	0	1	63
Syracuse	0	------	0	0	2	11	0	2	0	27	43
New Jersey:											
Camden	2	------	2	0	0	2	0	0	0	2	25
Newark	0	------	1	3	6	11	0	7	0	30	115
Trenton	0	------	1	0	2	1	0	1	1	1	30
Pennsylvania:											
Philadelphia	8	5	3	1	29	55	0	21	3	143	504
Pittsburgh	4	3	2	1	27	57	0	5	3	14	170
Reading	0	------	0	1	2	7	0	1	0	47	38
Scranton	0	------	------	0	------	2	0	------	0	2	------
Ohio:											
Cincinnati	3	------	0	1	13	6	0	8	0	5	146
Cleveland	0	10	0	1	10	39	0	13	2	33	190
Columbus	3	1	1	0	7	10	0	1	1	8	79
Toledo	2	2	1	1	7	4	0	2	0	18	72
Indiana:											
Anderson	0	------	0	0	0	11	0	1	0	2	9
Fort Wayne	0	------	0	0	1	2	0	1	0	0	19
Indianapolis	6	------	0	1	12	13	0	0	0	6	90
Muncie	0	------	0	0	1	0	0	1	0	0	9
South Bend	0	------	0	1	2	1	0	1	0	0	21
Terre Haute	0	------	0	0	0	4	0	0	0	0	19
Illinois:											
Alton	1	------	0	0	3	7	0	1	0	4	10
Chicago	6	4	3	4	31	146	0	24	2	60	623
Elgin	0	------	0	0	2	0	0	0	0	26	10
Moline	0	------	0	0	0	0	0	0	0	4	5
Springfield	2	------	0	0	1	4	0	0	0	19	25
Michigan:											
Detroit	24	2	1	7	17	78	0	19	0	86	216
Flint	2	------	0	0	0	9	0	0	0	7	25
Grand Rapids	0	------	0	0	1	14	0	0	0	13	31
Wisconsin:											
Kenosha	0	------	0	1	0	5	0	0	0	3	8
Milwaukee	2	2	2	2	5	31	2	8	0	37	103
Racine	0	------	0	2	0	5	0	0	0	5	10
Superior	0	------	0	1	1	2	0	0	0	5	11
Minnesota:											
Duluth	------	------	------	------	------	------	------	------	------	------	------
Minneapolis	6	------	0	0	2	10	0	0	0	17	83
St. Paul	0	1	1	2	6	12	0	2	0	24	65

City reports for week ended Nov. 21, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0	------	------	0	------	3	0	------	0	0	------
Davenport	0	------	------	0	------	2	0	------	0	0	------
Des Moines	3	------	------	0	------	8	0	------	0	2	33
Sioux City	0	------	------	0	------	11	4	------	0	1	------
Waterloo	0	------	------	0	------	2	0	------	0	18	------
Missouri:											
Kansas City	4	------	0	2	9	24	0	7	0	1	98
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	7	------	0	0	5	37	0	0	3	20	200
North Dakota:											
Fargo	1	------	0	0	2	8	0	0	0	0	7
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	0	------	0	0	0	0	0	0	0	0	0
South Dakota:											
Aberdeen	0	------	------	0	------	1	0	------	0	0	------
Nebraska:											
Omaha	1	------	1	1	4	4	0	0	0	8	64
Kansas:											
Lawrence	0	------	0	0	0	1	0	0	1	0	5
Topeka	0	------	0	0	1	5	0	1	0	0	17
Wichita	0	------	0	0	7	4	0	0	0	0	39
Delaware:											
Wilmington	0	------	0	1	3	0	0	0	0	1	29
Maryland:											
Baltimore	4	4	1	34	11	11	0	11	0	99	222
Cumberland	0	------	0	0	1	3	0	0	0	0	15
Frederick	0	------	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	8	------	0	3	16	12	0	18	2	20	200
Virginia:											
Lynchburg	2	------	0	0	4	0	0	0	0	0	7
Norfolk	3	------	0	0	2	3	0	3	1	0	30
Richmond	0	------	1	0	1	8	0	1	2	1	60
Roanoke	5	------	0	0	5	2	0	0	0	0	16
West Virginia:											
Charleston	0	------	0	0	6	0	0	1	2	0	31
Huntington	4	------	------	0	------	5	0	------	0	0	------
Wheeling	0	------	1	1	1	1	0	0	0	0	10
North Carolina:											
Gastonia	1	------	0	0	0	0	0	0	0	0	------
Raleigh	1	------	0	0	2	1	0	2	0	0	19
Wilmington	0	------	0	0	1	2	0	0	2	0	12
Winston-Salem	2	------	0	0	2	0	0	0	0	0	13
South Carolina:											
Charleston	5	11	0	0	2	4	0	0	0	0	17
Columbia	0	------	0	0	4	0	0	1	0	0	20
Florence	1	0	------	0	0	1	0	0	0	0	5
Greenville	1	0	------	0	2	0	0	0	1	0	7
Georgia:											
Atlanta	1	24	0	1	11	12	0	5	1	0	103
Brunswick	0	1	0	0	0	0	0	0	0	1	3
Savannah	8	8	1	0	3	0	0	5	0	2	43
Florida:											
Miami	1	3	1	1	2	0	0	0	0	0	31
Tampa	1	------	0	0	1	1	0	1	0	0	21
Kentucky:											
Ashland	1	------	------	0	1	3	0	------	0	0	8
Covington	0	------	1	0	2	0	0	0	0	0	11
Lexington	0	------	0	0	2	2	0	2	0	0	22
Tennessee:											
Memphis	4	------	1	1	6	9	0	10	2	5	102
Nashville	2	------	0	0	5	4	0	2	0	0	52
Alabama:											
Birmingham	4	4	0	0	12	5	0	3	2	0	75
Mobile	1	1	0	0	1	1	0	1	0	0	27
Montgomery	0	------	------	0	------	1	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	1	0	------	0	0	------
Little Rock	0	------	0	0	4	2	0	2	0	0	6
Louisiana:											
Lake Charles	0	------	0	0	1	0	0	0	1	0	5
New Orleans	14	2	0	0	14	10	0	16	1	2	154
Shreveport	0	------	0	0	7	1	0	0	0	0	30

City reports for week ended Nov. 21, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Muskogee	2	------	------	0	1	1	0	------	0	0	------
Oklahoma City	2	------	------	------	7	2	0	1	0	0	38
Tulsa	0	------	------	0	------	0	0	------	0	0	1
Texas:											
Dallas	1	1	1	1	11	16	0	8	2	14	88
Fort Worth	3	------	0	12	6	7	0	0	2	0	39
Galveston	1	------	1	0	4	0	0	2	0	0	22
Houston	12	------	1	0	10	5	0	8	0	0	83
San Antonio	0	------	2	0	8	8	0	10	0	0	67
Montana:											
Billings	0	------	1	0	1	2	1	0	0	0	6
Great Falls	0	------	0	0	1	1	0	0	0	2	8
Helena	0	------	0	0	0	0	0	0	0	0	2
Missoula	0	------	0	0	1	5	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	1	1	0	0	0	0	11
Colorado:											
Colorado Springs	0	------	0	0	5	5	0	2	0	0	15
Denver	1	------	0	8	9	11	0	5	0	34	73
Pueblo	2	------	0	0	2	4	1	1	0	4	12
New Mexico:											
Albuquerque	0	------	0	0	0	1	0	8	0	0	11
Utah:											
Salt Lake City	0	------	1	2	4	7	0	1	0	5	37
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	0	4	3	3	0	2	0	3	94
Spokane	0	------	0	0	2	6	0	0	0	4	27
Tacoma	0	------	0	0	0	4	0	0	0	0	26
Oregon:											
Portland	0	------	0	1	8	8	0	2	3	4	95
Salem	0	------	------	1	------	0	0	------	0	0	------
California:											
Los Angeles	18	20	1	3	33	32	0	26	0	53	324
Sacramento	4	------	0	3	1	22	0	1	0	5	27
San Francisco	0	------	2	1	12	20	0	16	0	23	203

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Nebraska:			
Boston	1	0	0	Omaha	1	0	1
New York:				Maryland:			
New York	5	4	0	Baltimore	8	1	0
Rochester	1	1	0	West Virginia:			
New Jersey:				Charleston	1	1	1
Newark	0	2	0	Kentucky:			
Pennsylvania:				Covington	1	0	0
Philadelphia	1	0	1	Lexington	1	0	0
Ohio:				Tennessee:			
Cincinnati	2	1	3	Memphis	1	0	2
Cleveland	0	0	1	Nashville	0	0	1
Columbus	1	0	0	Oklahoma:			
Toledo	0	0	2	Oklahoma City	1	0	2
Illinois:				Tulsa	0	0	12
Chicago	3	1	2	Texas:			
Michigan:				Houston	1	0	0
Detroit	3	3	1	Colorado:			
Iowa:				Denver	0	1	0
Des Moines	1	0	1	California:			
St. Louis	1	0	2	Los Angeles	1	0	2
				San Francisco	0	1	1

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Philadelphia, 1; Wichita, 1.
Pellagra.—Cases: Atlanta, 1; Savannah, 1; Birmingham, 1; New Orleans, 1.
Typhus fever.—Cases: Savannah, 1; Mobile, 1; Montgomery, 2.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended November 14, 1936.—During the 2 weeks ended November 14, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	1	3				1	6
Chicken pox		2	14	522	656	103	229	48	203	1,777
Diphtheria		7	2	62	14	7	3	1	2	98
Dysentery				3						3
Erysipelas				8	9	4	1	3	11	36
Influenza		3			3	1			13	20
Lethargic encephalitis				1	3					4
Measles				361	460	71	380	175	298	1,745
Mumps		16	6		189	8	29	26	279	553
Paratyphoid fever					2					2
Pneumonia					25		7		16	48
Poliomyelitis				12	15	25	5		1	58
Scarlet fever	4	20	6	259	323	152	46	222	99	1,131
Smallpox								1		1
Trachoma						1				1
Tuberculosis	4	68	22	96	82	9	21	3	15	320
Typhoid fever	1		4	46	9	14	7	1	8	90
Undulant fever				1	6		1		1	9
Whooping cough		21		197	330	18	65	8	42	681

CUBA

Habana—Communicable diseases—4 weeks ended November 21, 1936.—During the 4 weeks ended November 21, 1936, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1	1	Tuberculosis	13	
Diphtheria	12		Typhoid fever	[1] 32	6
Malaria	[1] 106	4			

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended November 14, 1936.—During the 4 weeks ended November 14, 1936, certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1			8		6	15
Cerebrospinal meningitis						1	1
Chicken pox						1	1
Diphtheria	2	1	1	1	1	2	8
Hookworm disease		2					2
Leprosy		9	2		3	4	18
Malaria	354	122	86	291	700	518	2,071
Measles						1	1
Poliomyelitis			1				1
Tetanus, infantile			1				1
Tuberculosis	6	13	59	45	17	11	151
Typhoid fever	40	33	13	23	11	31	151

DENMARK

Communicable diseases—July–September 1936.—During the months of July, August, and September 1936, cases of certain communicable diseases were reported in Denmark as follows:

Disease	July	August	September	Disease	July	August	September
Cerebrospinal meningitis	4	2	4	Paratyphoid fever	26	22	11
Chicken pox	8	9	7	Poliomyelitis	11	11	7
Diphtheria and croup	98	130	103	Puerperal fever	8	19	20
Epidemic encephalitis	1	4	3	Scabies	435	819	1,024
Erysipelas	243	225	257	Scarlet fever	823	505	949
German measles	75	9	17	Syphilis	70	55	87
Gonorrhea	942	1,009	1,062	Tetanus, neonatorum	9	6	3
Influenza	2,542	2,388	3,390	Tetanus, traumatic	1		
Malaria	9	17	5	Typhoid fever	2	3	7
Measles	108	73	84	Undulant fever (Bact. abort. Bang)	48	46	53
Mumps	291	242	267				
Paradysentery	76	51	72	Whooping cough	2,008	2,000	1,818

YUGOSLAVIA

Communicable diseases—October 1936.—During the month of October 1936, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	83	7	Paratyphoid fever	27	
Cerebrospinal meningitis	4	1	Poliomyelitis	11	2
Diphtheria	1,457	122	Scarlet fever	707	8
Dysentery	100	13	Sepsis	11	4
Erysipelas	321	12	Tetanus	48	20
Measles	1,500		Typhoid fever	869	99

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for November 27, 1936, pages 1659–1673. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued December 25, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina—Cordoba Province—Villa Dolores.—During the period November 1–15, 1936, 1 case of plague was reported in Villa Dolores, Cordoba Province, Argentina.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—One rat found on November 23, another rat found on November 27, and also another rat found on November 30, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

Smallpox

Brazil—Recife.—During the week ended October 31, 1936, 3 cases of smallpox (alastrim) were reported in Recife, Brazil.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Restrepo; month of July, 1 death, September 9, 1 death: Santander Department, month of July, 1 death.

Sierra Leone—Freetown.—On November 16, 1936, 1 suspected case of yellow fever was reported in Freetown, Sierra Leone.

UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

November 1–28, 1936

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the United States Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports, under the section entitled "Prevalence of Disease."

Poliomyelitis.—Further decline in the incidence of poliomyelitis continued through the month of November. For the current period there were 543 cases, as compared with 902 for the preceding 4-week period. Although the incidence was less than 10 percent in excess of that for the corresponding period in 1935, it was considerably above the incidence in the 3 preceding years; the numbers of cases for this period in those years totaled 332, 268, and 177, respectively. In 1930 and 1931, when epidemics prevailed mostly in the East, the incidence had declined considerably by the end of November, but the numbers of cases were still large—625 and 866, respectively, for the period in those years corresponding to the 4 weeks of this report.

Each geographic region, except the West South Central and Mountain, reported a decline during the current period. For the entire South Central region the incidence was more than three times that for the corresponding period in recent years. The highest incidence, however, had shifted from the East South Central region, where the current excess incidence began, to States in the West South Central region; in Oklahoma the number of cases rose from 8 for the preceding 4-week period to 84 for the current period, with a decline, however, from 31 cases for the first week of the period to 11 for the last week; Arkansas reported 21 cases for the period. Colorado, in the Mountain region, reported 22 cases, as compared with 3 for the preceding 4 weeks, with a decline from 10 for the first week to none for the last week. In the North Central region the number of

[1] From the Office of Statistical Investigations, U. S. Public Health Service. These summaries include only the 8 important communicable diseases for which the Public Health Service receives weekly telegraphic reports from the State health officers. The numbers of States included for the various diseases are as follows: Typhoid fever, 48; poliomyelitis, 48; meningococcus meningitis, 48, smallpox, 48; measles, 47; diphtheria, 48; scarlet fever, 48; influenza, 44 States and New York City. The District of Columbia is counted as a State in these reports.

cases was the highest recorded in recent years. Most of the increase in the East North Central region occurred in Illinois and Ohio, while the numbers of cases reported in several States in the West North Central region were slightly above the seasonal expectancy. Along the Atlantic coast and in the far West the incidence was relatively low.

Meningococcus meningitis.—The number of cases of meningococcus meningitis rose from 243 for the preceding 4-week period to 378 for the 4 weeks ending November 28. An increase of this disease usually occurs at this season of the year, but the current rise was somewhat above the normal seasonal expectancy. The incidence was the highest since 1929, when the number of cases for this period reached 474. In 1935, 1934, and 1933 the numbers of cases reported were 288, 129, and 157, respectively. Each geographic region contributed to the current increase, and in each region except the West North Central the number of cases was the highest in recent years. Every section of the country has felt the effects of the relatively high incidence of this disease that has prevailed since the winter of 1934–35; in some regions it was confined to only one or two States, while in others practically every State contributed to the increase. The cases reported for the current period from the following States represent considerable increases over last year: New York, 41 cases; Ohio, 36; Kentucky, 26; Virginia, 22; North Carolina, 12; West Virginia, 10; Utah, 8; and Idaho, 7.

Smallpox.—For the 4 weeks ending November 28, 333 cases of smallpox were reported, as compared with 928, 376, and 408 for the corresponding period in the years 1935, 1934, and 1933, respectively. Of the total cases, Montana reported 66, Oregon 54, North Dakota 47, Kansas 25, and Wisconsin 22. These States have been continuously among those in the Mountain, Pacific, and North Central regions reporting a high incidence since the beginning of 1935. In other States where the disease has also been unusually prevalent, particularly Washington, Colorado, Nebraska, and South Dakota, the number of cases dropped somewhat below the level of recent years. No cases were reported from the Atlantic coast regions, and in the South Central region the incidence remained at a low level.

Influenza.—For the 4 weeks ending November 28 there were 3,650 cases of influenza reported, as compared with 3,359, 3,721, and 4,596 for the corresponding period in the years 1935, 1934, and 1933, respectively. The influenza situation was very favorable in all sections of the country. The only increase over last year of any significance was reported from the South Atlantic region and was due mostly to a rather large number of cases reported from South Carolina.

Typhoid fever.—For the country as a whole the incidence of typhoid fever (1,245 cases) during the current 4-week period stood at about the average level for recent years. A comparison of geographic

regions, however, shows that the current incidence in the Middle Atlantic and North Central regions was considerably above that for the corresponding period last year; States in that region reporting a high incidence were as follows: Pennsylvania, 129 cases; Ohio, 92; Illinois, 82; and Missouri, 66. The East South Central regions also showed a slight increase with the incidence in Kentucky (72 cases) and Tennessee (71 cases) somewhat above the seasonal expectancy. In all other regions this disease was less prevalent than at this time last year.

Scarlet fever.—This disease continued to maintain a low level in relation to recent years. Reported cases for the current 4-week period totaled 14,695, as compared with 19,731, 19,141, and 17,714 for the corresponding period in the years 1935, 1934, and 1933, respectively In each geographic region the incidence was below that of last year, when the disease was unusually prevalent, but the decline toward the normal incidence was somewhat slower in the West North Central, and Mountain and Pacific than in other regions. The number of cases in each of these regions continued well above the average for the years 1929–34, inclusive.

Measles.—The 3,477 cases of measles reported for the 4 weeks ending November 28 was the lowest for this period in the 8 years for which these data are available. In 1935 the number of cases for this period totaled 6,876, while in 1934 and 1933, when an unusually large number of cases occurred, 17,222 and 10,567 cases, respectively, were reported. The recent high incidence of measles started in November 1933 and continued until the fall of 1935; since then the number of cases has declined rapidly to its present low level.

Diphtheria.—The incidence of diphtheria continued at a favorable level. For the current 4 weeks 3,804 cases were reported, as compared with 5,162, 5,239, and 7,442 cases for the corresponding period in the 3 preceding years. In 1931 the total number of cases of diphtheria reported for this period was approximately 9,400, about three and one-third times the number for the current period. The South Atlantic region has followed the level of 1935 very closely; for the current period the number of cases was about 15 percent above that for the corresponding period last year; North Carolina, with 486 cases, and Georgia, with 212 cases, seemed mostly responsible for the increase. In all other regions the incidence has been definitely lower than in recent years.

Mortality, all causes.—The average death rate from all causes in large cities for the 4 weeks ended November 28, as reported by the Bureau of the Census, was 11.5 per 1,000 inhabitants (annual basis). For the corresponding period in the years 1935, 1934, and 1933 the rates were 11.0, 11.1, and 11.2, respectively. The current mortality is therefore slightly higher than in recent years. During almost the

entire current year the average death rates by 4-week periods stood at the highest level in 5 years. During the earlier part of the year a minor epidemic of influenza accounted for the somewhat higher death rate, as did the extreme heat in July. The current excess apparently is not due to any specific cause.

HISTORY AND FREQUENCY OF DIPHTHERIA IMMUNIZATIONS AND CASES IN 9,000 FAMILIES

Based on Nation-wide Periodic Canvasses, 1928–31 [1]

By SELWYN D. COLLINS, *Principal Statistician, United States Public Health Service*

CONTENTS

Diphtheria was known as early as the Homeric period in Greece, and never since then has the world been free from occasional epidemics. In 1821 Bretonneau published a complete clinical description of the disease and gave it the name "diphtheria" (from the Greek, meaning "membrane"). In 1883 Klebs described the diphtheria bacillus, and in 1884 Löffler grew the bacilli in pure culture (*25*). Antitoxin was first used in 1894 for treating human cases and conferring temporary immunity upon family contacts. In 1913 Schick devised the test to determine immunity to diphtheria, and in the same year toxin-antitoxin immunization of a small number of human beings was reported by Von Behring (*26*). In the next 5 or 6 years the procedure was tested and used on a moderately extensive scale, particularly in institutions. The first extensive use of the method outside of institutions was inaugurated about 1920 by Park and Zingher (*26*) among New York City school and preschool children.

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

This is the ninth of a series of papers on sickness and medical care in this group of families (*1–8*). The survey of these families was organized and conducted by the Committee on the Costs of Medical Care; the tabulation was done under a cooperative arrangement between the Committee and the Public Health Service. Committee publications based on the results deal primarily with costs and Public Health Service publications primarily with the incidence of illness and the extent and kind of medical care, without regard to cost. As costs are meaningless without some knowledge of the extent and nature of the service received, there is inevitably some overlapping. The Committee staff, particularly Dr. I. S. Falk and Miss Margaret Klem, cooperated in the tabulation of the data.

Special thanks are due to Dr. Mary Gover, who assisted in the analysis, to Miss Lily Vanzee, who was in immediate charge of tabulating the data, and to other members of the statistical staff of the Public Health Service, particularly Dr. W. M. Gafafer, for advice and assistance in the preparation of the study

In the original registration States [2] the diphtheria death rate in 1900 was 40.4 per 100,000 total population; in 1910 the rate was 22.5 and the marked decline continued through the next decade, with a rate of 17.3 in 1920. About that time a still more rapid decline began, and the rate in the same group of States was 4.3 in 1930 and 1.3 in 1931.[3]

The course of diphtheria mortality in New York City and Massachusetts roughly parallels that in the registration States since 1900, and data from these sources are available for some years prior to 1870. Both sets of data indicate a peak about 1875, with a gradual decline thereafter. The New York City records reveal two periods when the decline in the diphtheria death rate was definitely accelerated, and these periods follow closely after the introduction of antitoxin in 1894 and the beginning of the more extensive use of toxin-antitoxin in 1920. In the Massachusetts data the latter point is clearly marked, but there is no apparent acceleration in the decline of the rate following the introduction of antitoxin.

At the time when the data for the present study were collected (1928–31), diphtheria immunization had been in fairly common use for a decade. This paper is concerned with the extent of the use of the procedure in cities of different sizes in the several geographic areas and in families of different income levels.

I. SOURCE AND CHARACTER OF DATA

In the study of illness in canvassed white families in 130 localities in 18 States [4] that was made by the Committee on the Costs of Medical Care (*22*) and the United States Public Health Service, all service received from physicians and other practitioners was recorded, whether for illness, immunization, physical examination, or other reason. The records of immunization [5] against diphtheria for all persons in the observed population afford data on the frequency of this procedure during 12 months covered by periodic canvasses; information was also obtained on the history of diphtheria immunizations and cases at any time prior to the study.

The composition and characteristics of the group of 8,758 families which were kept under observation for 12 consecutive months in the

[2] The original registration States of 1900 include Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Michigan, Indiana, and the District of Columbia.

[3] The rate for the total continental United States was somewhat higher, 3.3 per 100,000 in 1934.

[4] The 18 States sampled and the number of canvassed families were: California (890), Colorado (386), Connecticut (100), District of Columbia (99), Georgia (544), Illinois (403), Indiana (494), Kansas (301), Massachusetts (287), Michigan (329), Minnesota (224), New York (1,710), Ohio (1,118), Tennessee (212), Virginia (412), Washington (551), West Virginia (318), Wisconsin (290). Further details about the distribution of the canvassed population are included in a preceding paper (*1*).

[5] "Immunization" is used in this paper to mean the injection of the usual number of doses of toxin-antitoxin or toxoid. All cases receiving such service are designated as "immunizations"; no data are available on Schick tests following the injections to indicate whether or not the process actually produced immunity in the individual.

years 1928–31 have been considered in some detail in the first report in the series (*1*). These families, including a total of 39,185 individuals, resided in 18 States representing all geographic sections. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas. The observed group was similar to the general population with respect to age and sex composition, percentage native born, and percentage married. With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey.

The method of the study required, among other things, that local visiting nurses from health departments and other agencies make the canvasses of the homes to secure the data. A process of selection obviously entered here, since each locality that was included had a visiting nurse and a local health department or some other agency employing a visiting nurse. In such communities a larger percentage of the population may have received the immunizing injections than in those without health organizations On the other hand, since the report for the whole family was made by the housewife or some other adult female, the record of immunizations may be less complete than could be obtained by the questioning of individuals. However, the canvasses were periodic and corrections or additional information could be secured at subsequent visits.

II. HISTORY OF IMMUNIZATIONS AND CASES AT BEGINNING OF STUDY

VARIATION WITH AGE

Table 1 and figure 1 show for specific ages the proportion of individuals who had been artificially immunized against diphtheria and who had suffered attacks of diphtheria at any time in their lives. From 3.6 percent of children under 6 months and 7.5 percent of those 6 to 12 months of age who had received injections for immunizing against diphtheria, the curve rises to a maximum of 43 percent at 9 years. After this age there is a steady decline until at 20 to 24 years the percentage who had been artificially immunized is about the same as among children under 1 year of age. This curve represents the history of artificial immunization at any time in the past and would be expected to be cumulative in nature, but two facts account for the decrease at the adult ages: (*a*) Artificial immunization against diphtheria has been in extensive use only since about 1920 (10 years before these records were collected), and (*b*) adults are seldom given immunizing injections because the great majority of them have become immune to diphtheria by natural processes. Thus this curve of the history of artificial immunization against diphtheria, which is truly cumulative in character, does not appear to be cumulative;

however, a continuation of immunizations at the present rate until children now 10 years of age reach 40 or 50 years would result in a curve that would be cumulative in appearance.

TABLE 1.—*History of diphtheria immunizations and cases among persons of specific ages of each sex—canvassed white families in 18 States* [1]

Age in years	Both sexes: Percentage of persons with history of— Immunization or case at any time	Both sexes: Percentage of persons with history of— Immunization at any time but no case	Both sexes: Percentage of persons with history of— Case at any time	Both sexes: Total number of persons considered [2]	Percentage of persons with history of— Immunization at any time but no case: Male	Immunization at any time but no case: Female	Case at any time: Male	Case at any time: Female	Total number of persons considered [2]: Male	Total number of persons considered [2]: Female
All ages	21.1	15.8	5.30	37,827	16.3	15.4	4.45	6.11	18,553	19,274
Under 6 months	3.6	3.6	.33	529	10.0	9.2	.33	.34	915	893
6–11 months	7.5	7.5		390						
1	14.7	14.0		889						
2	22.0	20.5	1.50	1,044	21.1	22.2	1.92	1.06	1,093	1,034
3	24.3	22.8		1,083						
4	30.6	28.5	1.87	1,133	31.1	30.3	2.55	1.20	1,139	1,163
5	34.4	32.8		1,169						
6	40.4	37.8	3.09	1,158	40.1	39.2	3.29	2.88	1,184	1,144
7	45.1	41.5		1,170						
8	46.5	42.6	3.76	1,204	43.8	42.4	4.09	3.44	1,076	1,134
9	46.7	43.1		1,006						
10	46.6	40.8	5.61	1,077	36.2	36.5	5.44	6.22	2,299	2,266
11	43.8	38.5		902						
12	42.3	35.6	6.36	914						
13	40.0	34.0		830						
14	36.8	31.6	5.76	842						
15	34.4	28.0		686	19.6	17.7	6.16	5.94	1,525	1,516
16	26.7	19.8	5.95	708						
17	22.6	17.8		586						
18	19.4	13.3	5.94	574						
19	16.9	11.2		487						
20–24	12.2	5.3	6.93	2,108	4.2	6.1	5.61	7.89	891	1,217
25–29	10.1	3.4	6.69	2,482	4.3	3.1	5.27	7.86	2,393	3,232
30–34	10.5	3.7	6.81	3,143						
35–44	9.4	2.9	6.49	5,914	3.5	2.2	4.89	8.11	2,966	2,948
45–54	8.2	1.6	6.57	3,349	.9	1.6	4.85	9.46	3,072	2,727
55–64	8.2	.9	7.31	1,463						
65 and over	8.7	.6	8.11	987						

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

[2] A few individuals known as to case history were unknown as to immunization history (11 out of the 37,827 persons); the rates in every instance are based on the known only.

In agreement with the White House Conference study (*24*), higher percentages of preschool children had been artificially immunized against diphtheria than had been vaccinated against smallpox. But this situation was true only in the preschool ages, and relatively few children are vaccinated until the time of school entrance; in the school ages a much larger percentage had been vaccinated against smallpox than had been immunized against diphtheria.

The percentage of children with a history of a clinically recognized and remembered attack of diphtheria was small as compared with the percentage artificially immunized; the curve, therefore, for the total with a history of an immunization or a clinical case is similar to that for artificial immunizations only. However, for the ages above 25 years the histories of clinical cases are twice as frequent as the histories of artificial immunizations.

None of these curves represents the total with immunity to diphtheria, because Schick tests indicate that a large proportion of persons, particularly older children and adults, are relatively immune to diphtheria without a history of an artificial immunization or a clinically recognized case. No data on Schick tests are available on the group considered in this study. In a former study, figures of this kind for three cities (Baltimore, Syracuse, and Kansas City) were assembled from the literature and combined rates computed for

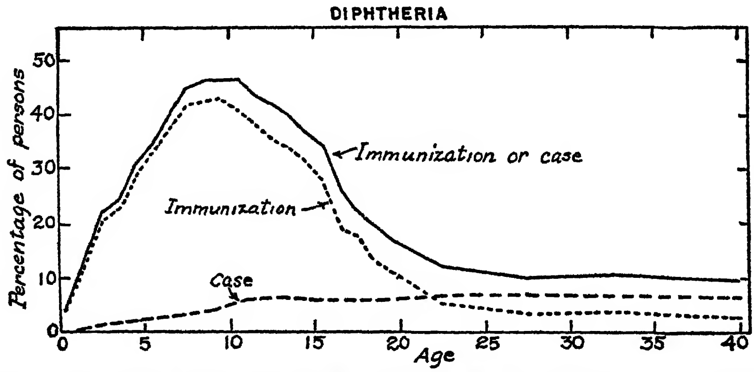

FIGURE 1.—Percentage of persons of specific ages (*a*) who had been immunized and (*b*) who had suffered an attack of diphtheria—8,758 canvassed white families in 18 States, 1928-31.

single years of age (*18*). In these three cities nearly 60 percent of adults had a negative Schick reaction prior to any artificial immunization. If the negative Schick curve for those cities is representative of other cities, it indicates that almost as many children under 10 years give a negative Schick reaction prior to immunization as give a history of artificial immunization. If the artificial immunizations were done without prior Schick tests (as is the common practice), a considerable part of them were not needed; but if it can be assumed that only those of positive Schick reaction were immunized, then the percentages with some present immunity would be nearly twice as high as the percentage artificially immunized. Table 2 presents a method of estimating the percentage of children with immunity to diphtheria acquired either by natural or artificial means, on the assumption of no Schick tests prior to immunization. The Schick test results from Baltimore, Syracuse, and Kansas City may

not be representative of the places of various sizes covered in this survey but they serve to illustrate the method.

TABLE 2.—*Method of estimating percentages of children of specific ages who are immune to diphtheria by artificial or natural processes when immunizations were done without preliminary Schick tests*

Age last birthday (in years)	Of a total of 100 children of each age				
	(1) Number who are Schick negative without artificial immunization	(2) Number who give a history of artificial immunization	(3) Number artificially immunized who would have been Schick negative without the artificial immunization	(4) Number artificially immunized who would otherwise have been Schick positive	(5) Number with immunity by artificial or natural processes
Under 1	11.1	5.2	0.6	4 6	15.7
1	6.7	14 0	.9	13.1	19.8
2	11 2	20.5	2.3	18 2	29.4
3	16.2	22.8	3.7	19.1	35.3
4	21.6	28.5	6.1	22.4	44.0
5	27.0	32.8	8.9	23 9	50.9
6	32.3	37.8	12.2	25.6	57.9
7	37.2	41.5	15.4	26 1	63.3
8	41.6	42.6	17.7	24.9	66.5
9	45.5	43.1	19.6	23.5	69.0
10	48.7	40.8	19.9	20.9	69.6
11	51.3	38.5	19.8	18.7	70.0
12	53.4	35.6	19.0	16.6	70.0
13	55.0	34.0	18.7	15.3	70 3
14	56.2	31.6	17.8	13.8	70.0

Column 1=Data for Baltimore, Syracuse, and Kansas City (*18*).
Column 2=Data for the surveyed families in this study (8,758 white families in 18 States).
Column 3=Column 2 multiplied by column 1 (with decimal moved 2 points to left).
Column 4=Column 2 minus column 3.
Column 5=Column 1 plus column 4. No correction is made for the fact that injections of toxin-antitoxin or toxoid do not always result in immunity in a given child; with more refined data and with immunizations and Schick tests for the same community, such a correction should be made.

It is seen in table 2 that, with an assumption of 49 percent of 10-year old children as Schick negative prior to immunization and an artificial immunization of 41 percent of such children without preliminary Schick tests, one would expect a total of 70 percent of children of this age to have some immunity acquired either by natural or artificial processes.

IMMUNIZATIONS AMONG MALES AND FEMALES

Considering all ages under 20 years, 33.6 percent of the males and 33.0 percent of the females gave a history of immunization or a case of diphtheria at some time in their lives. These percentages are made up of 29.8 and 29.4 for males and females, respectively, who had been immunized but had not suffered attacks, and 3.8 and 3.6 percent of males and females, respectively, who had suffered attacks of diphtheria. The data are shown for specific ages in table 1 and figure 2. The history of immunization is almost identical for the

two sexes. The history of cases is slightly more frequent among males than among females under 10 years of age. The large and consistent excess for adult females (table 1) is no doubt due in part to the fact that the women, who were usually the informants, knew their own histories better than those of their husbands and other adult males in the household. Because of this reporting error, the 8 percent of female adults with a history of diphtheria is probably nearer the truth for both sexes than the 6 to 7 percent shown in figure 1. In a study (*18*) based on data collected about 1920 it appeared that approximately 10 percent of living adults gave a history of diphtheria; the lower diphtheria rates in recent years may have reduced this for the young adults, and the figures for older adults are less reliable because of less and less complete reporting as the time of the childhood attack recedes into the past.

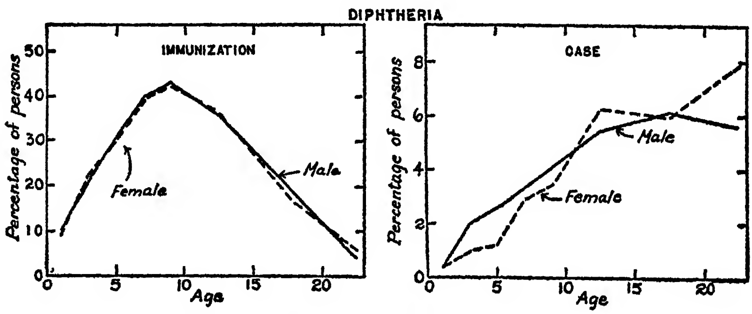

FIGURE 2.—Percentage of males and females of specific ages (*a*) who had been immunized and (*b*) who had suffered an attack of diphtheria—8,758 canvassed white families in 18 States, 1928-31.

TABLE 3.—*History of diphtheria cases at any time among male and female students in various universities,*[1] *1925*

Sex	Percentage of students who had suffered an attack of diphtheria					Total number of students reporting				
	All ages	17-19	20-24	25-29	30 and over	All ages	17-19	20-24	25-29	30 and over
Both sexes	10.8	9.6	10.4	12.0	13.3	4,689	927	2,485	719	558
Male	11.0	9.9	11.0	12.1	10.1	2,757	392	1,430	570	[illegible]
Female	10.6	9.3	9.6	11.4	19.2	1,932	535	1,055	149	193

[1] The group considered made the reports at the end of the U. S. Public Health Service study of respiratory diseases (*29*); it included students in 11 colleges and universities throughout the country. The universities included are Harvard (Boston), Mount Holyoke College (South Hadley, Mass.), Johns Hopkins (Baltimore), Georgetown (Washington, D. C.), Winthrop College (Rock Hill, S. C.), Tulane (New Orleans), Chicago (Chicago), Ohio State (Columbus), Utah (Salt Lake City), Arizona (Tuscon), and California (Berkeley).

For comparison with results in the present study, table 3 shows reports of case histories among male and female students in 11 colleges and universities (*29*), each person reporting on his or her own history only. In these data, which were collected in 1925, males of the three

age groups under 30 years show slightly higher percentages with a history of diphtheria than females of the same ages.

VARIATION IN THE FREQUENCY OF A HISTORY OF IMMUNIZATION WITH GEOGRAPHIC LOCATION AND SIZE OF CITY

The proportion of persons who have been immunized against diphtheria might be expected to vary from one community to another and from one geographic area to another because some health departments have had specific immunization campaigns and others have done little to encourage immunization.

Geographic location.—The 18 States in which the surveyed population lived may be divided into 4 geographic sections, the *Northeast* (New York, Massachusetts, Connecticut), representing the New England and Middle Atlantic States; the *North Central* (Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas), representing the North Central States; the *South* (District of Columbia, Virginia, West Virginia, Tennessee, Georgia), representing the South Atlantic and South Central States; and the *West* (Colorado, California, Washington), representing the Mountain and Pacific States.[6]

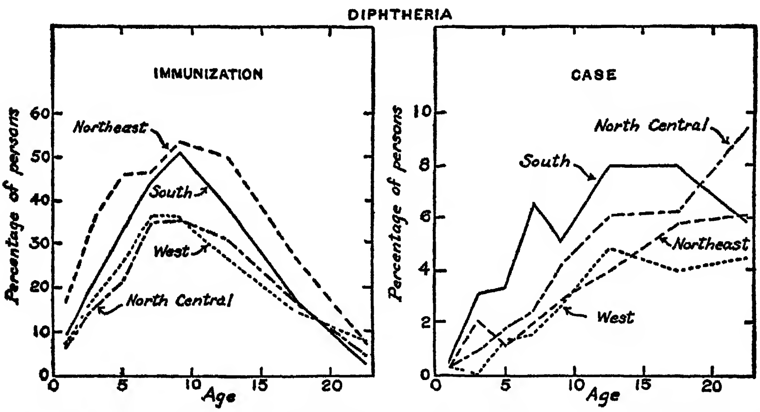

FIGURE 3.—Percentage of persons of specific ages in four geographic sections (*a*) who had been immunized and (*b*) who had suffered an attack of diphtheria—8,758 canvassed white families in 18 States, 1928–31

In the left half of figure 3 immunization history rates have been plotted for each of the four geographic sections of the United States (table 4). The Northeast stands above other sections with the South next to it. The North Central and West show fewer immunizations.

The right half of figure 3 shows histories of clinical attacks of diphtheria (table 5). Although the numbers of cases are small and, consequently, the curves irregular, the South stands rather clearly above the other regions, with the North Central a little above the

[6] Further details about the number of families from each State and size of each city are included in a previous paper (*1*).

Table 4.—*History of diphtheria immunizations among persons in four geographic sections [1] of the United States—canvassed white families in 18 States [2]*

Age in years	Percentage of persons with a history of—								Total number of persons considered			
	Immunization or case at any time				Immunization at any time but no case							
	North-east	North Central	South	West	North-east	North Central	South	West	North-east	North Central	South	West
All ages	26.7	18.4	23.0	17.7	20.9	13.5	17.4	12.7	8,865	14,191	7,591	7,180
Under 2	17.8	6.9	10.0	7.3	17.0	6.6	9.5	7.0	388	699	418	303
2-3	38.5	15.8	25.2	17.8	36.4	14.9	22.0	17.3	483	852	445	347
4-5	47.0	23.5	37.1	27.5	45.9	21.7	33.8	26.1	545	908	482	367
6-7	48.5	37.2	50.5	38.3	46.5	34.7	44.0	36.7	513	929	505	381
8-9	56.2	39.5	56.1	39.1	53.4	35.4	51.0	36.5	498	869	452	391
10-14	54.2	37.1	40.6	31.7	50.2	31.0	38.6	26.8	1,052	1,731	1,000	782
15-19	32.5	22.8	25.0	18.7	26.8	16.5	17.0	14.7	715	1,036	663	627
20-24	13.5	13.8	8.1	12.3	7.4	4.3	2.3	7.9	474	757	447	430
25-44	10.7	9.1	8.2	12.0	3.0	6.2	2.3	4.4	2,570	4,567	2,197	2,205
45 and over	11.3	7.1	6.1	7.8	1.2	1.4	.9	1.3	1,627	1,843	982	1,347

[1] A preceding paper (1) gives the number of families canvassed in each State classified according to the size of the city of residence. States included in the survey were, by region—
Northeast: New York, Massachusetts, Connecticut.
North Central: Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas.
South: District of Columbia, Virginia, West Virginia, Tennessee, Georgia.
West: Washington, California, Colorado.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

Table 5.—*History of diphtheria cases among persons in four geographic sections [1] of the United States—canvassed white families in 18 States [2]*

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	North-east	North Central	South	West	North-east	North Central	South	West	North-east	North Central	South	West
All ages	5.81	4.94	5.64	5.00	515	701	428	359	8,865	14,191	7,591	7,180
Under 2	.26	.29	.48	.33	1	2	2	1	388	699	418	303
2-3	2.07	.94	3.15	-----	10	8	14	------	483	852	445	347
4-5	1.10	1.76	3.32	1.36	6	16	16	5	545	908	482	367
6-7	1.95	2.48	6.53	1.57	10	23	33	6	513	920	505	381
8-9	2.81	4.14	5.09	2.56	14	36	23	10	498	869	452	391
10-14	3.99	6.12	8.00	4.86	42	106	80	38	1,052	1,731	1,000	782
15-19	5.73	6.27	7.99	3.99	41	65	53	25	715	1,036	663	627
20-24	6.12	9.51	5.82	4.42	29	72	26	19	474	757	447	430
25-34	8.14	5.69	7.34	6.88	99	131	79	71	1,216	2,301	1,076	1,032
35-44	7.31	6.05	4.55	8.27	99	137	51	97	1,354	2,266	1,121	1,173
45 and over	10.08	5.70	5.19	6.46	164	105	51	87	1,627	1,843	982	1,347

[1] For definition of sections, see footnote [1] to table 4.
[2] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

Northeast and the West. The feeling generally prevails that less diphtheria would be expected in the South, probably because the disease in its clinical form is almost absent in tropical countries. However, diphtheria mortality in 1929–30 was definitely higher in southern than in northern States; the annual death rate per 100,000 population for these years was 7.5 in the South (8.5 for white), as compared with 5.4, 5.0, and 3.6 for the same period in the Northeast,

North Central, and West, respectively (table 24). In 1920, however, the diphtheria death rates were about as high in the northern as in the southern States (*19*).

In reported cases the South is not so high (table 24), but the completeness of the reports varies so much that little dependence can be placed in the comparison. The suggestion is afforded, however, that the relatively younger age of attack in the South, which has been pointed out by Doull (*21*) and Dauer (*19*), may result in a high case fatality of the disease; thus the death rate rather than the case rate would be exceptionally high in that geographic section.

Table 6 shows diphtheria history rates as given by college students who were reporting on themselves only, the students being classified according to their home States (*29*). The South tends to be high in histories of clinical diphtheria.

TABLE 6.—*History of diphtheria cases at any time among students in various universities classified according to the student's home State, 1925* [1]

Geographic section [2]	Percentage of students who had suffered an attack of diphtheria					Total number of students reporting				
	All ages	17-19	20-24	25-29	30 and over	All ages	17-19	20-24	25-29	30 and over
Northeast	11.6	8.1	12.7	10.8	14.7	957	198	474	176	109
North Central	11.3	11.4	10.7	12.0	12.7	1,352	237	684	234	197
South	13.0	11.4	13.8	12.0	13.3	747	114	318	142	173
West	8.9	8.8	8.1	13.1	12.3	1,547	365	972	145	65

[1] The group considered made the reports at the end of the U. S. Public Health Service study of respiratory diseases (*29*); it included the students in 11 colleges and universities throughout the country. The total of 4,689 persons reporting on diphtheria included 2,757 males and 1,932 females; 86 persons who did not designate their home State are excluded from this table. The universities included are Harvard (Boston), Mount Holyoke College (South Hadley, Mass.), Johns Hopkins (Baltimore), Georgetown (Washington, D. C.), Winthrop College (Rock Hill, S. C.), Tulane (New Orleans), Chicago (Chicago), Ohio State (Columbus), Utah (Salt Lake City), Arizona (Tucson), and California (Berkeley).

[2] In terms of the geographic areas used in the U. S. Census reports, the four sections represent the following areas:
Northeast: New England and Middle Atlantic.
North Central: East and West North Central.
South: South Atlantic and East and West South Central.
West: Mountain and Pacific.

Cities and rural areas.—Variations in immunization practice are more likely to follow municipality and State boundaries than geographic regions. In this study the numbers included from single States are not generally large and there is no uniformity in the urban-rural distribution of the canvassed population of the different States. However, the surveyed group in New York State was large, making up the bulk of the Northeast families, and was predominantly rural. Because of the unrepresentative urban-rural distribution of this large canvassed population and the greater frequency of immunizations in the State, further tabulations consider New York by itself. Table 7 shows immunization history rates for all surveyed States, for all except New York, and for New York State alone.

TABLE 7.—*History of diphtheria immunizations among persons in cities of various sizes and in rural areas—canvassed white families in 18 States* [1]

Age in years	Percentage of persons with history of—								Total number of persons considered			
	Immunization or case at any time				Immunization at any time but no case							
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
	All 18 surveyed States											
All ages	18.0	21.5	25.0	22.9	12.1	16.1	19.8	18.9	14,087	9,518	7,441	6,781
Under 2	8.6	8.8	12 7	12.1	7.9	8.8	12.4	12.1	677	537	331	263
2–3	17.2	22 3	29.0	30.0	14.8	20.9	28.1	29.4	748	584	448	347
4–5	29.0	30 2	38.8	35.1	26.8	28.5	37.0	33.6	758	639	503	402
6–7	40.7	42.8	46.6	42.1	36.2	39.6	44.5	41.1	838	586	524	380
8–9	40.9	47.4	52.1	50.4	34.8	44.5	49.7	48.3	772	589	424	425
10–14	36 9	43.6	47.0	44.7	29.2	37.4	42.7	41.0	1,577	1,104	908	976
15–19	18 4	26.4	30.7	27.5	10 5	20.1	25.4	24.0	1,035	757	569	680
20–24	13 6	11.2	13.9	8.9	4 7	4.4	7.0	6.3	863	502	360	383
25–44	9.4	10.8	11.3	7.6	2.7	3.1	4.8	2.8	4,666	2,931	2,226	1,716
45 and over	6.9	7.3	11.0	9.3	1.6	.6	1.4	1.3	2,153	1,289	1,148	1,209
	All surveyed States except New York											
All ages	16.5	21.0	23.1	20.8	11.0	15.2	17.7	17.1	12,442	8,048	5,035	5,137
Under 2	7.0	6.1	10.3	12.2	6.2	6.1	9.8	12.2	645	445	214	189
2–3	13 5	17 9	23.9	25.7	12.0	16.3	22.6	24.9	680	486	305	257
4–5	24.8	28.0	33.5	30.7	22.6	25.9	31.1	29.4	669	535	328	303
6–7	33.6	42.1	43.6	35.5	34.5	38.3	41.0	34.1	752	496	378	290
8–9	38 8	46.8	46.3	42.6	32.8	43.5	43.6	40.4	609	509	298	322
10–14	34.0	43 2	39.4	39.9	26.5	36.1	34.1	36.0	1,379	917	642	787
15–19	15.7	26 5	27.8	27.0	8.5	19.4	22.3	23.1	875	620	418	544
20–24	13.2	12.4	13.7	8 0	4.2	4.6	7.9	4.5	758	411	257	286
25–44	8.8	11.4	12.0	7.6	2.6	3.4	4.9	3.1	4,150	2,545	1,504	1,295
45 and over	6.5	6.7	10.4	7.4	1.6	.7	1.7	1.4	1,835	1,084	691	864
	New York State											
All ages	29.2	24.6	28.9	29.3	20.4	21.1	24.2	24.4	1,645	1,470	2,406	1,644
Under 2	40.6	21.7	17.1	12.2	40.6	21.7	17.1	12.2	32	92	117	74
2–3	54.4	43.9	39.9	42.2	42.6	43.9	39.9	42.2	68	98	143	90
4–5	60.7	41.4	48.6	48.5	58.5	41.4	48.0	46.5	89	104	175	99
6–7	59.3	46.7	54.1	63.3	51.2	46.7	53.4	63.3	86	90	146	90
8–9	60.3	51.2	65.9	74.8	53.5	51.2	64.3	72.9	73	80	126	103
10–14	57.1	45.3	65.4	64.5	48.0	43.4	63.5	61.9	198	187	266	189
15–19	33.1	25.5	38.7	29.4	21.2	22.6	34.1	27.2	160	137	151	136
20–24	16.2	5.5	14.6	11.3	7.6	3.3	4.9	11.3	105	91	103	97
25–44	13.6	6.7	9.8	7.4	3.5	1.6	4.6	1.9	516	386	722	421
45 and over	9.1	10.2	11.8	13.9	1.6	------	.9	.9	318	205	457	345

[1] Dates of interviews varied from 1926 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

The left half of figure 4 shows immunization history rates for metropolitan, urban, and rural areas. The purpose of the chart is to compare cities of different sizes, and New York State is excluded to obtain more comparable groups of cities.

The three curves in figure 4 representing, respectively, rural areas, small towns, and small cities, appear quite close together. However, the rates for cities over 100,000 in this group are below those for the smaller towns and rural areas. In New York State also (table 7) the small towns and rural areas canvassed had higher immunization history rates than the large cities.

New York State Health Department records on immunizations are available for comparison; they are published for municipalities with populations of 10,000 or over and for smaller towns and rural areas. Rates for the 2 years 1929 and 1930, the approximate period of the survey, are shown in table 8, together with similar rates for the surveyed families. In both groups the cities show higher rates than the rural places for the ages 5–9 and lower rates for the ages 10–14 years. For children under 5 the health department reports show more immunizations in the cities, but the surveyed families show the reverse.

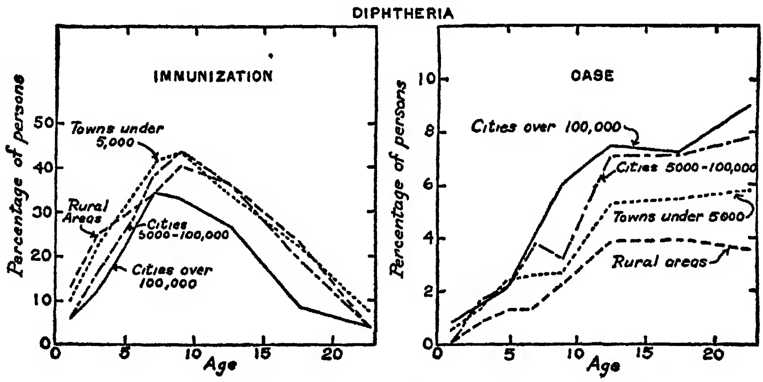

FIGURE 4.—Percentage of persons of specific ages in cities and rural areas (a) who had been immunized and (b) who had suffered an attack of diphtheria—7,048 canvassed white families in 17 States, 1928–31 (New York excluded).

For the various age groups the rates as reported by the health department for the general population are higher than those for the canvassed families.

As already noted, it is possible that the rural and small-town communities included in the present survey were a rather selected group with respect to immunizations, in that every community had a health department or a visiting nurse or both. However, with all of the qualifications and limitations that must be considered in the interpretation of the data, it seems clear that the differences between urban and rural areas with respect to diphtheria immunization were not as large as those found for smallpox vaccination (*7*). The White House Conference study (*24*) of diphtheria immunizations among pre-school children bears out this conclusion; although immunization rates in the several ages for the group of 156 selected cities were consistently

TABLE 8.—*Annual diphtheria immunizations per 1,000 persons of specific ages in urban and rural parts of New York State: (a) As reported by the State health department for the general population in 1929–30, and (b) as found in canvassed white families during 12 consecutive months, 1928–31*

Size of city	General population of New York State exclusive of New York City				Surveyed families in New York State							
					All immunizations				Immunizations in public clinics only			
	Total under 15 years	Under 5	5–9	10–14	Total under 15 years	Under 5	5–9	10–14	Total under 15 years	Under 5	5–9	10–14
	Annual diphtheria immunizations per 1,000 population											
Cities over 10,000	113.6	134.3	166.1	42.8	55.8	80.9	66.8	17.1	42.3	48.5	61.7	14.2
Towns under 10,000 and rural areas	77.8	79.7	107.6	45.6	51.4	89.4	31.7	24.6	45.8	80.5	25.3	24.6
	Number of diphtheria immunizations											
Cities over 10,000	168,937	61,736	85,145	22,056	62	30	26	6	47	18	24	5
Towns under 10,000 and rural areas	112,281	35,714	54,143	22,424	92	60	20	12	82	54	16	12

TABLE 9.—*History of diphtheria cases among persons in cities of various sizes and in rural areas—canvassed white families in 18 States* [1]

Age in years	Percentage of persons with history of a case at any time				Number of persons with history of a case at any time				Total number of persons considered			
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
	All 18 surveyed States											
All ages	5.9	5.4	5.2	4.0	832	517	384	270	14,087	9,518	7,441	6,781
Under 2	.7	------	.3	------	5	------	1	------	677	537	331	263
2–3	2.4	1.4	.9	.6	18	8	4	2	748	584	448	347
4–5	2.2	1.7	1.8	1.5	17	11	9	6	758	639	503	402
6–7	4.5	3.2	2.1	1.0	38	19	11	4	838	586	524	380
8–9	6.1	2.9	2.4	2.1	47	17	10	9	772	589	424	425
10–14	7.7	6.2	4.3	3.7	122	69	39	36	1,577	1,104	908	976
15–19	7.9	6.3	5.3	3.5	82	48	30	24	1,035	757	569	680
20–24	8.9	6.8	6.9	2.6	77	34	25	10	863	502	360	383
25–34	7.3	8.1	6.2	3.2	173	115	68	24	2,363	1,427	1,004	741
35–44	6.0	7.3	6.8	6.0	139	110	77	58	2,303	1,504	1,132	975
45 and over	5.3	6.7	9.6	8.0	114	86	110	97	2,153	1,289	1,148	1,209
	All surveyed States except New York											
All ages	5.5	5.8	5.4	3.7	688	466	270	190	12,442	8,048	5,035	5,137
Under 2	.8	------	.5	------	5	------	1	------	645	445	214	189
2–3	1.5	1.6	1.3	.8	10	8	4	2	680	486	305	257
4–5	2.2	2.1	2.4	1.3	15	11	8	4	669	535	328	303
6–7	4.1	3.8	2.6	1.4	31	19	10	4	752	496	378	290
8–9	6.0	3.3	2.7	2.2	42	17	8	7	699	509	298	322
10–14	7.5	7.1	5.3	3.9	104	65	34	31	1,379	917	642	787
15–19	7.2	7.1	5.5	3.9	63	44	23	21	875	620	418	544
20–24	9.0	7.8	5.8	3.5	68	32	15	10	758	411	257	286
25–34	6.8	8.2	6.7	3.2	146	100	48	17	2,158	1,226	716	532
35–44	5.7	8.0	7.5	5.5	114	105	59	42	1,992	1,319	788	763
45 and over	4.9	6.0	8.7	6.0	90	65	60	52	1,835	1,084	691	864

[1] Dates of interviews varied from 1928 to 1931. Data refer to histories at the beginning of the 12-month morbidity study.

higher than in the group of 597 counties studied, the differences were not generally large (table 10).

TABLE 10.—*Comparison of the history of diphtheria immunizations among preschool children in the present study with the results of the White House Conference study in 156 cities in 45 States and 597 counties in 42 States*

Group	Percentage of children of the given ages who had been immunized					
	Under 1	1	2	3	4	5
URBAN						
Canvassed families:						
All States except New York (17 States):						
Cities of 100,000 or over	4.1	8.2	12.2	11.9	19.3	25.7
Cities 5,000–100,000	1.7	11.2	14.3	18.0	20.4	31.1
White House Conference study (*24, pp. 59, 174*):						
156 cities mostly over 50,000	3.3	16.5	22.1	24.1	27.0	31.8
Median of the 156 cities	1	8	13	16	19	25
RURAL						
Canvassed families:						
All States except New York (17 States):						
Towns under 5,000	5.4	13.1	23.4	21.9	31.8	30.5
Rural areas	7.0	17.8	23.8	25.9	30.3	28.4
White House Conference study (*24, p. 175*):						
Towns under 2,500 and farms	2.5	10.7	18.2	22.3	25.8	29.2

The right half of figure 4 shows diphtheria case history rates for cities of different sizes in the 17 surveyed States (excluding New York). The rates for the rural areas are the lowest and those for large cities the highest, with the other two groups falling logically between the two extremes. In New York State also the surveyed families in large cities had definitely higher case history rates, but there was little variation in the other three community classes.

It is possible that better diagnostic facilities in the large cities increase to some extent their reported diphtheria rates. It seems reasonable to assume that the identification of mild cases by laboratory methods occurs more frequently in cities than in rural areas.

Cities and rural areas in each geographic section.—Diphtheria immunization and case history rates may be considered for cities of different sizes in each geographic area. Figure 5 shows such rates (adjusted for age) for persons under 25 years of age. In each geographic area the immunization rates tend to be larger in the small towns and rural areas;[7] the case history rates, on the other hand, are significantly higher in the large cities than in the rural places in all the sections.

Mortality in the registration States bears out the conclusion that about 1930 diphtheria occurred more frequently in urban than in

[7] The differences between immunization rates in large cities and rural areas are statistically significant for the 3 sections but not for New York.

rural places. In the years 1929 and 1930 the annual average death rates were as follows:

Size of city	*Annual diphtheria death rate per 100,000 population*
Cities over 100,000	6. 41
Cities of 10,000 but under 100,000	5. 81
Towns under 10,000 and rural areas	5. 27

An examination of diphtheria mortality since 1915 in the States of the expanding registration area indicates that in every one of the 16 years from 1915 to 1930 the rate in places with 10,000 or more population was higher than in rural areas, but in all 3 years from 1931 to 1933 (last available data on this point), the urban rate was below the rural.

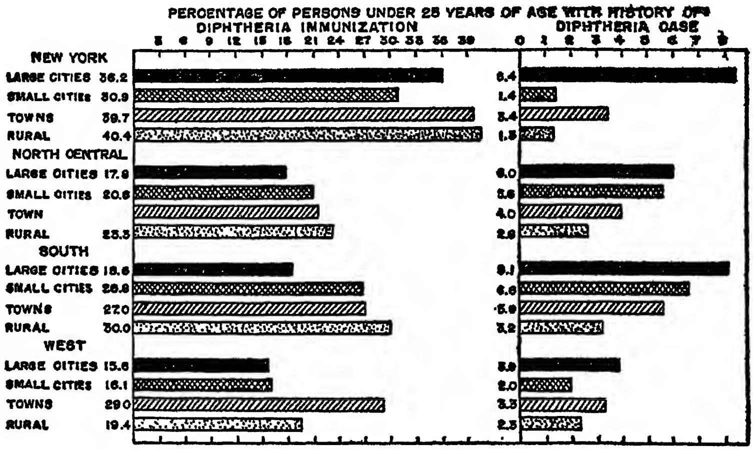

FIGURE 5.—Percentage of persons under 25 years of age in metropolitan, urban, and rural parts of four geographic sections (*a*) who had been immunized and (*b*) who had suffered an attack of diphtheria—8,371 canvassed white families in 16 States, 1928–31 (Massachusetts and Connecticut excluded). (Rates adjusted to the age distribution of the white population under 25 years of age in the registration States, 1930.)

There appears to be much variation in the different States with respect to the relation of urban to rural diphtheria mortality. In general, the rate for rural parts of the South seems to be higher than the rate for southern cities and in general the rate for rural parts of the North seems to be lower than the rate for northern cities, but in both areas there are numerous exceptions. The situation is changing so rapidly that any generalizations must be considered as more or less tentative.

Large shifts in the urban-rural distribution of the population occurred during the depression, which make population estimates less reliable since 1930. Also, there is always the possibility that the allocation of deaths for residence will change the urban-rural mortality picture. With respect to diphtheria, however, neither of these factors appears to explain the shift in the urban-rural diphtheria situation.

According to the annual reports of a number of large cities, for example, Baltimore and Detroit,[7a] the percentage of their child population that has been immunized has increased considerably since 1930. It is possible that the situation both as to the proportion of children immunized and the mortality in urban as compared with rural areas has changed considerably since 1930.

TABLE 11.—*Annual diphtheria immunizations per 1,000 persons of specific ages of each sex—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age in years	Both sexes [1]			Immunizations per 1,000 population per year		Number of immunizations		Population (years of life)	
	Immunizations per 1,000 population per year	Number of immunizations	Population (years of life)	Male	Female	Male	Female	Male	Female
All ages [1]	12.6	487	[1] 38,544	11.9	13.4	224	263	18,896	19,627
All ages under 15	30.5	481	15,706	28.1	32.9	223	258	7,929	7,846
Under 6 months	8.9	4	450	9.3	9.2	2	2	215	218
6–11 months	66.7	36	540						
1	65.0	82	1,261	56.2	62.3	83	85	1,476	1,365
2	47.9	50	1,044						
3	43.8	47	1,072						
4	40.1	46	1,146	39.4	43.1	66	74	1,675	1,715
5	40.1	47	1,172						
6	36.3	42	1,158						
7	20.5	24	1,171	22.1	30.7	50	70	2,262	2,281
8–9	24.4	54	2,214						
10–11	14.7	29	1,980	[2] 9.6	11.9	22	27	2,301	2,267
12–13	8.6	15	1,744						
14–15	4.6	7	1,530						
16–17	1.5	2	1,296	[3] .6	2.0	1	3	1,527	1,523
18–19	--------	--------	1,068						
20–24	.9	2	2,119	--------	1.6	--------	2	894	1,225
25 and over	--------	--------	17,392	--------	--------	--------	--------	8,467	8,925

[1] "All ages" includes a few of unknown age; "both sexes" includes a few of unknown sex.
[2] 10–14 years.
[3] 15–19 years.

III. IMMUNIZATIONS AND CASES DURING THE 12-MONTH STUDY

The record of all medical care, whether for illness or preventive service, affords accurate data on the frequency of immunizations against diphtheria during the 12 months of the morbidity study.

The histories of prior immunization refer to the whole life of the individual and the resulting percentages tend to average out the periods of high and low immunization rates. The record for the 1 year,

[7a] In 1929 and 1930 only about 10 percent of Baltimore preschool children had been immunized against diphtheria, but in 1935 about 45 percent had been immunized; not much change had occurred in the percent of the 5–9 year group that had been immunized (Baltimore City Health Department Report, 1935, p. 98). In 1929 and 1930 one-fourth to one-third of Detroit preschool children had been immunized against diphtheria but in 1935 nearly 60 percent had been immunized. As in Baltimore not much change had occurred in the percent of the 5–9 year group that had been immunized (City Health, Bulletin of the Detroit Department of Health, July, 1936, p. 4).

although more accurate than the history data, may represent more frequent or less frequent immunizations than the average over a period of years. Even the average over a period of years may not represent the true expectancy. In fact the frequency of diphtheria immunizations has been changing so rapidly in recent years that any estimate of an expected rate would probably be unreliable even for the immediate future.

As a test of the representativeness of the study year, the current rates may be cumulated to approximate a curve of immunization histories that would result from the repetition year after year of the current diphtheria immunization rates.[8] Conversely, an approximation of the annual immunization rates per 100 for given years of age may be obtained from the cumulative curve by computing differences between the percentages immunized for successive ages.

It was pointed out in connection with figure 1 that the history of diphtheria immunization reaches a maximum at 9 years, after which the curve declines and thus ceases to resemble a cumulative curve such as would be expected if the immunization of children had been practiced for a longer period of years. However, a comparison of the cumulative curve and current rates may be made for children up to 9 or 10 years of age.

The cumulative curve of diphtheria immunization histories indicates that 30.7 percent[9] of children have been immunized by the time they reach their fifth birthday and the cumulation of the current rates up to 5 years of age gives 23.5 percent. To put it in another way, the cumulative figure of 30.7 percent by 5 years indicates an average annual rate for children under 5 years of 61.4 per 1,000 as against the observed rate of 48.1 per 1,000.

Carrying the procedure to 10 years of age the history curve indicates that 43.1 percent were immunized by the tenth birthday and the cumulation of the current rates gives 38.3 percent. If one deducts from the 43.1 percent who have been immunized by the tenth birthday the 30.7 percent immunized before the fifth birthday, there are 12.4 percent immunized between the fifth and tenth birthdays or an average annual rate of 24.8 per 1,000 as compared with an observed current rate at these ages of 29.2 per 1,000.

The current immunizations per 1,000 for children under 5 years of age amounted to about 80 percent of the average for years immediately preceding the survey, but for children 5–9 years of age the current rate was slightly above preceding years. When the age group under 10 years is considered as a whole, the average immunization rate for the period of the study was 38.3 per 1,000 children as compared with 43.1 for immediately preceding years.

In view of the fact that nurses were collecting the data in this study and may have suggested immunization in the course of their visits with the mother, it is rather surprising that the current rate is slightly less than that of preceding years. It suggests, however,

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[8] The method is valid only if all of the current immunizations are first immunizations, an assumption that seems approximately true up to 10 years of age.

[9] The figure 30.7 percent who have been immunized by 5.0 years of age is a straight line interpolation between 28.5 at 4 years and 32.8 at 5 years of age at last birthday, which represent children of an average age of 4.5 and 5.5 years, respectively. For 10.0 years the figure for 9-year-olds (9.5 years) was used since the curve begins to decline at 10 years of age.

that the association of the nurse-enumerator with the health department did not affect the data as much as might have been expected.

AGE AND SEX

Figure 6 shows diphtheria immunizations during the study year per 1,000 persons in specific age and sex groups (table 11). In the curve as plotted for both sexes the first point represents children under 6 months and indicates that few immunizations are done before infants reach that age. However, the maximum immunization rate occurs among infants from 6 to 12 months of age, with the rate only slightly less for the 1-year-olds. From the maximum the curve declines almost without interruption as age increases. This

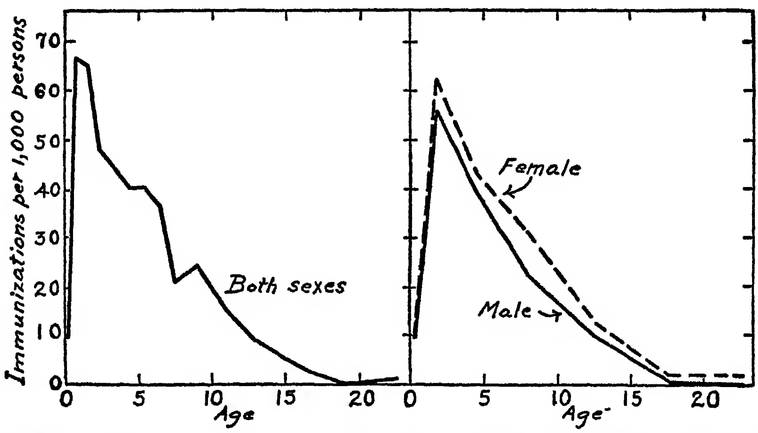

FIGURE 6.—Annual diphtheria immunizations per 1,000 persons of specific ages for each sex—8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31

age curve is rather surprisingly ideal in that immunization at an early age has been extensively advocated to give the child immunity before the time of greatest risk of attack. In table 12 immunization rates are shown by geographic area, and in table 13 they are shown for cities of different sizes. In each category immunizations in the preschool ages were more frequent than in the school ages. Although the numbers were small in some areas, age specific rates (5-year groups) were computed for children in four sizes of city classes for each of the four geographic areas. Throughout these various classes of communities the tendency was clear for current immunization rates to be higher among preschool than school children.

In former years it was common practice for emphasis to be placed on immunizing the school children, probably because of the greater ease of reaching them in school. It is possible that the connection of the nurse-enumerator with the health department led her to suggest immunization to the mothers with infants and young children.

but it has just been seen that this practice was not so extensive as to make the total immunization rate excessively high for the study year.

TABLE 12.—*Annual diphtheria immunizations in four geographic sections*[1] *per 1,000 children of specific ages—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age in years	Immunizations per 1,000 population per year				Number of immunizations				Population (years of life)			
	Northeast	North Central	South	West	Northeast	North Central	South	West	Northeast	North Central	South	West
All ages under 15	49.9	29.4	17.1	23.7	179	181	58	63	3,589	6,157	3,396	2,654
Under 2	92.2	42.5	33.4	59.9	45	37	17	23	488	870	509	384
2–3	101.9	32.0	29.3	23.1	49	27	13	8	481	815	443	347
4–5	50.9	40.4	31.0	35.2	28	37	15	13	550	915	484	369
6–9	36.5	31.7	11.5	19.4	37	57	11	15	1,015	1,797	959	772
10–14	19.0	13.3	2.0	5.1	20	23	2	4	1,055	1,730	1,001	782

[1] A preceding paper (*1*) gives the number of families canvassed in each State classified according to the size of the city of residence. The States included in the survey were as follows:
Northeast: New York, Massachusetts, Connecticut.
North Central: Illinois, Ohio, Michigan, Indiana, Wisconsin, Minnesota, Kansas.
South: District of Columbia, Virginia, West Virginia, Tennessee, Georgia.
West: Washington, California, Colorado.

TABLE 13.—*Annual diphtheria immunizations in cities of different sizes per 1,000 children of specific ages—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age in years	Immunizations per 1,000 population per year				Number of immunizations				Population (years of life)			
	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas	Cities of 100,000 or over	Cities 5,000–100,000	Towns under 5,000	Rural areas
All ages under 15	32.2	28.1	30.2	30.8	178	117	98	88	5,535	4,158	3,242	2,861
Under 2	62.0	40.0	51.0	66.9	52	26	22	22	839	652	431	329
2–3	51.6	39.4	51.2	37.5	38	23	23	13	736	584	449	347
4–5	42.8	57.8	27.8	22.3	33	37	14	9	771	640	503	404
6–9	27.9	20.4	29.5	28.5	45	24	28	23	1,611	1,176	950	806
10–14	6.3	6.3	12.1	21.5	10	7	11	21	1,578	1,106	909	975

In view of the known shift from the immunization of children in the schools to a definite attempt to reach the preschool child, the age curve of diphtheria immunizations is a rather artificial and changing one. The reports of the New York State Health Department (*16*) show, in 5-year age groups, the number of known immunizations in New York State exclusive of New York City for each year since 1926. In 1926, 17 percent of the immunizations were among children under 5 and 53 percent were among those 5–9 years of age. Each year the percentage of the immunizations of children under

5 years has increased until in 1935, 63 percent were under 5 years and only 29 percent were 5–9 years of age. According to the State report, immunization rates in 1929–30 (the time that data for the present study were collected) were higher for the school than for the preschool ages (table 8).

The frequency of immunizations at specific ages for each sex is shown in the right half of figure 6 (table 11). The age groups used are somewhat broader, the first point representing infants under 6 months and the second point 6 months but under 3 years. Both sexes show low rates for children under 6 months and both likewise show the highest rates for the youngest group above 6 months of age. In the various ages above 6 months, immunizations are slightly more frequent among girls than boys but the differences are not statistically significant.[10] There would seem to be no reason to expect differences between the sexes with respect to immunization rates at these early ages.

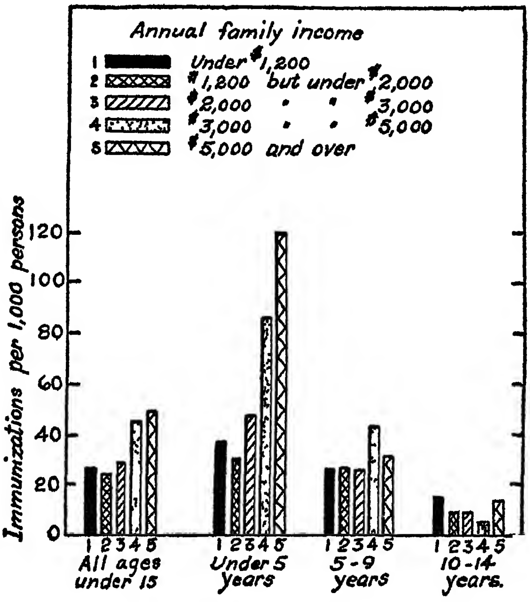

FIGURE 7.—Annual diphtheria immunizations per 1,000 persons of specific ages in canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31.

FAMILY INCOME

Considering children of all ages under 15 years, diphtheria immunizations increase from 27.2 per 1,000 in families with annual incomes of less than $1,200, to 49.7 among persons with family incomes of $5,000 or over. Figure 7 and table 14 show rates by family income for children of three age groups. Among preschool children (under 5 years) the increase in immunization rates with income is marked; the lowest rate, 31.6 per 1,000, occurs in families with $1,200–$2,000 annual income, with a slightly higher rate (37.4) in families with incomes of less than $1,200. The rate in families with an income of $5,000 or above (120.1) is approximately four times the rate in the

[10] The test applied was the probable error of the difference between the two series of rates (in the several age groups) as outlined by Dr. Lowell J. Reed (28)

$1,200–$2,000 income group. For the school ages there is little variation in immunization rates in the several income classes.

VARIATION IN SPECIFIC LOCALITIES

It has been seen that some sections of the country have higher immunization histories than others (fig. 3) and also that the current immunization rates differ considerably in the several geographic regions (table 12). An examination of data for individual surveyed localities discloses that diphtheria immunizations during the 12-month study were concentrated in rather few communities but not to such a degree as either typhoid immunizations (*8*) or smallpox vaccinations (*7*). Of the 119 localities with 10 or more families under observation, 18 localities, or 15 percent, including 12 percent of the families, contributed 51 percent of the current diphtheria immunizations. The other 49 percent of the immunizations were contributed by 40 percent of the communities while the remaining 45 percent of the communities, including 30 percent of the families, reported no immunizations among the surveyed families during the study year (table 15).

TABLE 14.—*Annual diphtheria immunizations per 1,000 children of specific ages in canvassed white families of different income levels in 18 States during 12 consecutive months, 1928–31*

Annual family income	Immunizations per 1,000 population per year				Number of immunizations				Population under observation [1]			
	All ages under 15	Under 5	5–9	10–14	All ages under 15	Under 5	5–9	10–4	All ages under 15	Under 5	5–9	10–14
Under $1,200	27.2	37.4	26.7	15.3	73	36	25	12	2,681	962	936	783
$1,200 but under $2,000	24.3	31.6	27.5	9.9	146	70	60	16	6,006	2,216	2,178	1,612
$2,000 but under $3,000	29.2	48.2	26.3	9.8	114	66	37	11	3,897	1,370	1,409	1,118
$3,000 but under $5,000	45.5	86.5	43.6	5.8	77	46	28	3	1,691	532	642	517
$5,000 and over	49.7	120.1	31.9	13.9	69	46	16	7	1,389	383	502	504

[1] Nearly all persons were under observation the entire 12 months. For births during the study an adjustment was made to reduce their observation period to full-time years of life.

TABLE 15.—*Percentage of localities, of families, and of diphtheria immunizations in places with considerable numbers of immunizations, with few and with no immunizations in the surveyed group—canvassed white families in 119 localities with 10 or more families under observation during 12 consecutive months, 1928–31*

Diphtheria immunizations in the surveyed families during the year of the study	Percentage of—			Number of—		
	Localities	Families	Immunizations	Localities	Families	Immunizations
All localities	100.0	100.0	100.0	119	8,713	487
Localities with a considerable number of immunizations (10 or more per 100 families)	15.1	11.8	51.4	18	1,032	250
Localities with few immunizations	39.5	58.7	48.6	47	5,113	237
Localities with no immunizations	45.4	29.5		54	2,568	

No intensive study was made of a possible relationship between the prevalence of diphtheria and the time or frequency of immunization, but a cursory examination of the data indicates that the presence of a diphtheria case in the community did not stimulate immunizations to the extent that a smallpox case stimulated vaccinations (7). The longer period necessary to complete the three injections and acquire immunity makes the procedure less applicable in the face of epidemics.

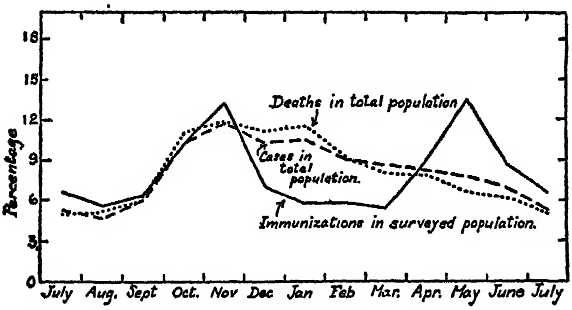

FIGURE 8.—Percentage of immunizations and of diphtheria cases and deaths in each month (30-day basis)—immunizations in the surveyed families in 18 States, 1928–31; cases and deaths in the general population of 18 States, 1929–30.

An interesting difference occurs in the age distribution of diphtheria immunizations in communities having a considerable number of immunizations and in those with few immunizations. In the group with considerable numbers, only 28 percent of the immunizations are among children under 3 years of age and 45 percent are in the school ages of 6–14 years. In the communities with few immunizations, 43 percent are among children under 3 years, with only 24 percent in the 6–14 year group (table 16). Although less frequent, immunizations that arise from individual initiative are apparently done at earlier ages than those stimulated by immunization campaigns.

TABLE 16.—*Age distribution of diphtheria immunizations in communities with considerable numbers and in those with few immunizations—canvassed white families in 119 localities with 10 or more families under observation during 12 consecutive months, 1928–31*

Immunizations in surveyed families during the year of the study	Percentage of immunizations that were in each age group						Number of immunizations					
	All ages	Under 3	3–5	6–9	10–14	15 and over	All ages	Under 3	3–5	6–9	10–14	15 and over
18 localities with a considerable number of immunizations (10 or more per 100 families)	100.0	28.4	25.2	30.4	14.4	1.6	250	71	63	76	36	4
47 localities with few immunizations	100.0	42.6	32.5	18.6	5.5	.8	237	101	77	44	13	2

SEASONAL VARIATION

Diphtheria cases and deaths are more frequent in the fall and winter months (October–January) than in other seasons of the year (fig. 8 and table 17). In the communities under study there seemed

to be little relation between the season of immunization and the seasonal prevalence of diphtheria. The data indicate a double peak in the frequency of immunizations—one in November and the other in May. However, it cannot be said that this double peak represents a tendency that would be expected to repeat itself.[11]

TABLE 17.—*Seasonal distribution of diphtheria immunizations in the surveyed families and of diphtheria cases and deaths in the general population*

	All months		July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	Number	Percentage in each month (corrected to 30-day basis)												
Diphtheria immunization in the surveyed population, 1928–31, all localities	487	100.0	6.7	5.6	6.5	10.2	13.3	7.1	5.8	5.8	5.4	9.0	13.5	8.8
Diphtheria[1] in the total population of the 18 surveyed States, based on calendar years 1929–30:														
Cases	81,766	100.0	5.3	4.7	6.0	10.4	11.8	10.4	10.6	9.1	8.6	8.3	7.8	7.0
Deaths	6,720	100.0	5.1	5.2	6.1	11.1	11.9	11.1	11.5	9.2	8.0	7.8	6.6	6.2
Diphtheria[1] in the total population of continental United States:														
Based on calendar years 1929–30:														
Cases	151,941	100.0	4.6	4.8	7.0	11.9	13.3	10.8	10.3	8.7	8.2	7.5	6.9	6.0
Deaths	14,065	100.0	4.3	5.2	6.8	12.4	13.5	12.3	11.7	9.0	7.4	6.7	5.6	5.2
Based on medians for the 7 years 1922–28:														
Cases	108,176	100.0	4.9	4.9	7.1	11.3	12.7	11.1	10.5	9.7	8.1	7.2	6.5	6.1

[1] Cases from Notifiable Diseases in States (*17*) and deaths from Mortality Statistics (*9*), supplemented by State reports (*17*) for South Dakota in 1929 and Texas in 1929 and 1930.

DIPHTHERIA IMMUNIZATIONS IN HOUSEHOLDS ATTACKED BY THE DISEASE

Immunizations prior to the study.—Of the 321 individuals in the 57 attacked households, 45 persons,[11a] or 14 percent, gave a history of artificial immunization, with no case prior to the study, as compared with 16 percent in the whole surveyed population. Of the 321 individuals, 19 persons, or 5.9 percent, had been previously attacked, as compared with 5.3 percent in the whole surveyed population.

Considering only persons under 15 years of age, there were 172 such individuals in attacked households and 36 of them, or 21 percent, had been previously immunized, as compared with 32 percent in the whole surveyed group; 10 of the children under 15 years, or 5.8

[11] The peak in immunizations which occurs in the autumn is quite largely the result of 39 immunizations among 91 families in a Kansas town of 14,000 population, which appears to be associated with a threatened outbreak of diphtheria. Of two diphtheria cases reported to the local health department during 1929, one occurred in October and the other in November. Of the 39 immunizations in the surveyed families, 9 were in October and 28 in November. The high concentration of immunizations in the months when cases occurred suggests that the immunizations may have been stimulated by this threatened epidemic. If these 39 immunizations are eliminated, the fall immunization peak is almost eliminated, but the spring peak seems to represent a more widespread tendency to do immunizations at this season of the year without regard to the presence of diphtheria in the community.

[11a] One other person who had no immunization or case before the study was immunized during the study and later had an attack. In the tables on attacks during the study, this person is counted as having a prior immunization.

percent, had been previously attacked, as compared with 3.3 percent in the whole surveyed group.

Immunizations during the 12-month study.—Of the 116 children under 15 years of age in attacked households who were themselves not attacked, 21 children, or 18.1 percent, were actively immunized (exclusive of antitoxin injections) during the study year, as compared with 3.1 percent among children of these ages in the whole surveyed group. The presence of a case in the household seems to have stimulated immunizations that would not have occurred otherwise.

Of the 74 children under 15 years of age in attacked households who were themselves not attacked and who had not been previously immunized or attacked, 20 children, or 27 percent, were immunized during the year. Of these 20 children, 16 also had antitoxin.

Of the 42 children under 15 years of age in attacked households who were themselves not attacked but who had been previously immunized or attacked, 1 child (2.4 percent) was immunized during the study year.

Of the 116 children under 15 years of age in attacked households who were themselves not attacked, 37 persons, or 32 percent, received antitoxin. Of the 74 children under 15 years of age in attacked households who were themselves not attacked and who had not been previously immunized or attacked, 33 persons, or 45 percent, received antitoxin.

DIPHTHERIA CASES IN THE OBSERVED POPULATION

Rates based on attacked households.—Among the 321 persons in attacked households, the 70 cases [12] of diphtheria that occurred amount to an attack rate of 21.8 per 100. Among the 172 children under 15 years of age in attacked households, there were 56 diphtheria cases, which gives an attack rate of 32.6 per 100.

Of the 70 cases of diphtheria, 59 were primary or first cases in the household and 11 were secondary cases, that is, attacks among those

[12] The 70 cases of diphtheria occurred in 57 households, 47 households had only 1 case, 8 had 2 cases, but in 2 households both cases had the same date of onset, 1 household had 3 cases; and 1 had 4 cases Geographically the cases were distributed as follows

State	Number of families attacked	Number of cases of diphtheria	Number of families under observation	State	Number of families attacked	Number of cases of diphtheria	Number of families under observation
New York	29	32	1,710	Georgia	2	2	514
Ohio	6	8	1,148	Kansas	2	2	301
Virginia	3	5	412	Michigan	2	2	329
California	4	4	890	Massachusetts	1	2	287
Illinois	1	4	463	West Virginia	1	2	313
Indiana	2	3	494	District of Columbia	1	1	99
Colorado	2	2	386	Washington	1	1	551

who were exposed to a case in the household. Deducting the 59 primary cases from the 321 persons in attacked households, there were 262 persons exposed to these cases and 11 of them, or 4.2 percent, were attacked.

TABLE 18.—*Diphtheria attack rates among persons exposed to a case in the household—57 attacked households among 8,758 canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age in years	All persons in household					Persons with no history of artificial immunization or prior case				
	Total persons	Primary [1] cases	Total persons minus primary cases	Secondary [1] cases	Secondary attack rate per 100	Total persons	Primary [1] cases	Total persons minus primary cases	Secondary [1] cases	Secondary attack rate per 100
All ages	321	59	262	11	4.2	256	54	202	10	5.0
All under 15	172	47	125	9	7.2	125	43	82	8	9.8
Under 5	49	14	35	5	14.3	38	13	25	4	16.0
5–9	76	24	52	4	7.7	57	22	35	4	11.4
10–14	47	9	38	--------	1.6	30	8	22	--------	2.6
15–19	28	4	24	1		20	3	17	1	
20 and over	121	8	113	1	.9	111	8	103	1	1.0

[1] Two cases in a household with onset on the same day are both counted primary; secondary includes all with a date of onset subsequent to the first case.

Considering in a similar way those persons under 15 years of age who were exposed to a case in the household, 7.2 percent were attacked. Limiting the group under consideration still further to children under 15 years of age who were without prior attack or immunization, 9.8 percent of those exposed to a case in the household were attacked. These various types of secondary attack rates are shown in table 18 for children of three age groups. A further restriction of the exposed population to those with a positive Schick test would increase still more the secondary attack rate, but no data on Schick tests are available for the group surveyed in this study.[13]

The secondary attack rates among all children (table 18) are of the same order of magnitude as those found by Doull (*20, p. 399*) for Baltimore for the years 1920–23.

Among 82 children under 15 years with no prior immunization or attack who were exposed to a case in the household, there were 8 cases, or a secondary attack rate of 9.8 percent. Among 43 children of the same ages with a history of a prior immunization or attack who were exposed to a case in the household, there was 1 attack or a secondary attack rate of 2.3 percent.

[13] It is impossible to determine from the record whether any child who had a secondary case had received preventive antitoxin injections after the first case in the household occurred; any statement about antitoxin being given such a child who had a case may have referred to its therapeutic rather than its preventive use.

Incidence in the surveyed population.—Of the 70 cases of diphtheria in the surveyed population, 63 had their onset within the study year and 7 cases began just prior to but were sick during the year. The 63 new cases give an annual rate of 163 per 100,000 persons, as compared with a reported average annual rate of 62 per 100,000 for the United States in 1929–30. Adjustment of the rate in the surveyed group to the age distribution of the general population brings it down to 130 per 100,000, a figure that is still more than twice the reported case rate.

A canvass of over 27,000 families including nearly 120,000 individuals in various counties in Illinois (*13, p. 28*) indicates that 65 percent of the 232 diphtheria cases that occurred in that group during 1929 were reported to the health department.[14] If it can be assumed that 65 percent of diphtheria cases in the country as a whole are reported, then the rate for the United States would be about 95 per 100,000 as compared with 130 in the surveyed group. If a larger percentage is reported, the discrepancy between the two rates would be greater. It appears probable that the rate in the canvassed group was exceptionally high.

Of the total of 70 cases of diphtheria, 64 occurred among persons who had never been immunized, but 6 occurred among those who reported a history of injections for diphtheria immunization. Of the 6 cases, the injections in 2 instances were done within 10 weeks of the onset of the illness; in a third case the date of the injections was recorded only as "1929" and the onset of the case was on November 12 of that year. Park, Williams, and Krumwiede (*27, p. 366*) indicate that the full effect of a series of injections cannot be expected in all children before 2 to 3 months after the first injection. Thus in 3 of the 6 cases with prior injections, there is some doubt whether sufficient time had elapsed for the development of immunity. In the other 3 instances the cases occurred a year or more after the injections had been given. The data did not include results of Schick tests subsequent to the injections; since it is known that in a small proportion of children the usual number of injections does not produce a negative Schick reaction, one would expect some susceptibles in the group with a history of injections. In the computations that follow, all of the 6 cases under review are considered as occurring among the immunized group, although three of them are doubtful.

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[14] In a group of 68 southeastern counties with full-time health officers, 84 percent of 568 diphtheria cases located by similar surveys were reported to the health departments. (Communicable diseases and activities for their control in the Brunswick-Greensville area. Brunswick-Greensville health administration studies no. 7. By J. O. Dean and Elliot H. Pennell. Pub. Health Rep., July 24, 1936. (Reprint No. 1761.)

TABLE 19.—*Age incidence of diphtheria in the total observed population and in that part of the population which had no history of an artificial immunization or a case—canvassed white families in 18 States, 1928–31*

	All ages [1]	All under 15 years	Age: Under 2	2–3	4–5	6–7	8–9	10–14	15–19	20–24	25–44	45 and over
Total observed population:												
Number of persons (years of life)	38,544	15,796	2,251	2,116	2,318	2,329	2,214	4,568	3,050	2,119	11,570	5,822
Number of cases	70	56	3	9	12	13	10	9	5	4	4	1
Annual case rate per 1,000	1.82	3.55	1.33	4.25	5.18	5.58	4.52	1.97	1.64	1.89	0.35	0.17
Persons with no history of artificial immunization or prior case:												
Number of persons (years of life)	[2] 30,408	[2] 10,409	[2] 2,069	1,634	1,553	1,332	1,181	2,640	2,287	1,850	10,401	5,318
Number of cases	64	51	2	9	11	12	9	8	4	4	4	1
Annual case rate per 1,000	2.10	4.90	0.97	5.51	7.08	9.01	7.62	3.03	1.75	2.16	0.38	0.19

[1] "All ages" includes a few of unknown age.
[2] "Under 5 years" includes 441 years of life for the 761 children born during the study who are excluded from the history of immunization tables because the histories are recorded as of the beginning of the study before these children were born. Since they are exposed to the risk of attack, they belong in any table of current rates.

Table 19 shows diphtheria rates for the total population and for persons who gave no history of a prior case or artificial immunization. Since no data are available on Schick test results, the latter is the nearest approach which can be made to a nonimmune group, but it would include many who have become immune by natural processes. In table 20 the current incidence of diphtheria in the immunized group is compared with that among persons with no history of a prior case or immunization. Since the two groups differ considerably in age composition, it is necessary to correct the rates for these age differences. When this adjustment is made, the rate for those with a history of immunization is 0.43 per 1,000, as compared with 2.10 among those who had not been immunized or attacked. To put it in another way, the number of cases occurring in the group which had been immunized was only 20 percent of the number expected if the rates had been the same as in the group not previously immunized or attacked. A computation of the probable error of the expected number of cases indicates that the difference between the immunized and nonimmunized groups is statistically significant.

A similar computation was made for persons who had been previously attacked by diphtheria. No cases occurred in this group, while the expected number was four. The number of persons involved was rather small, and the difference between the actual and expected number (four cases) is not statistically significant as judged by its probable error.

Similar computations were made for persons under 15 years of age, with adjustment for age differences within that group (table 20). Although the rates for these ages are higher than for the total

population, the relationships are approximately the same as described above for all ages.

TABLE 20.—*Annual incidence of diphtheria in nonimmunized and immunized groups of the surveyed population—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Group	Number of persons under observation	Case rate per 1,000		Actual number of cases [2]	Expected number of cases if there had been no history of immunization or case (age corrected [3])	Ratio of actual to expected (expected = 1.00)
		Crude	Adjusted [1]			
	All ages					
No history of immunization or prior case	30,408	2.10	2.10	64	64	1.00
History of immunization but no prior case	6,002	1.00	.43	6	30	.20
History of a prior case	2,012			0	4	
	All ages under 15 years					
No history of immunization or prior case	10,409	4.90	4.90	51	51	1.00
History of immunization but no prior case	4,869	1.03	.87	5	28	.18
History of a prior case	502			0	3	

[1] Adjusted to the age distribution of the group with no history of immunization or case by the method of expected cases as outlined in Pearl's Medical Biometry and Statistics (2d ed., pp. 265–269). Since the rates in the group with no history of immunizations were used as the standard age-specific rates in the adjustment process, the crude and adjusted rates for this group are the same.

[2] Of the 6 cases with prior immunization, 3 received the injections within a few months of the onset of the illness, and thus the disease may have been contracted before a sufficient time had elapsed for the development of an immunity. Of the 3 doubtful cases, 2 were under and 1 was over 15 years of age. See text for a more complete discussion.

[3] Expected cases obtained by applying age-specific rates (table 19) for persons who had never been immunized to the numbers of persons in the various ages in the group under consideration.

The significance of the difference between the expected and actual number of cases for a given group was tested as follows: (a) An expected rate was computed by dividing the expected cases by the number of persons in the group; (b) the standard error of the *expected number* of cases was computed by the formula $\sigma=\sqrt{npq}$, in which n=number of persons in group, p=expected rate per person, and $q=1-p$; (c) difference between actual and expected number of cases, x, was divided by the standard error, σ, as computed above; (d) from tables of $\frac{x}{\sigma}$ in Pearl's Medical Biometry and Statistics (2d ed., p. 440), the probability of a chance deviation as great as, or greater than, that occurring in this case was obtained.

The results indicate that the actual cases are significantly lower than expected for those who had been artificially immunized (all ages and also under 15 years), but not for those with history of a prior case (neither age class). The number of individuals in this group is too small to obtain reliability when dealing with as small a rate as that for diphtheria.

AGE AND SEX INCIDENCE OF DIPHTHERIA AS REPORTED TO STATE HEALTH DEPARTMENTS

The 70 cases of diphtheria in the surveyed population are sufficient to give only a general picture of the age incidence of the disease (table 21). However, a number of State health department reports show the age distribution of reported cases. Table 22 and figure 9 show the age incidence of diphtheria (single years to 10) in Alabama and New York State. The reported rates are quite different in the two States, but the curves are drawn on scales that afford an accurate comparison of the relative age curves. In Alabama the peak incidence

comes at 3 to 4 years of age, with a secondary peak at 6 years, which is presumably associated with school entrance. In New York the incidence has a single peak at 6 years; after this maximum the decline is more gradual in New York than in Alabama.

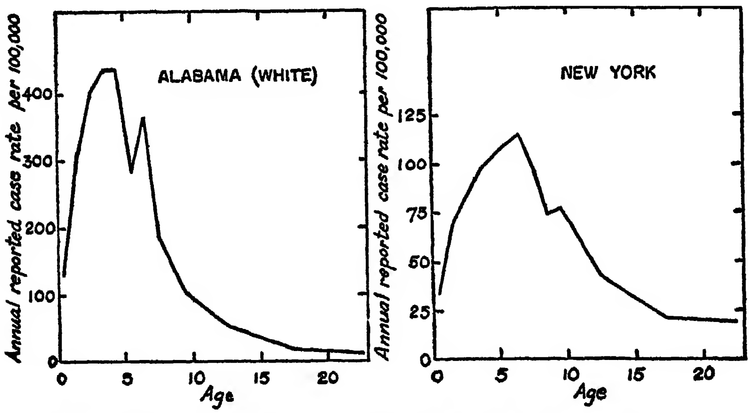

FIGURE 9.—Age incidence (in single years to 10) of diphtheria as reported to health departments in Alabama and New York (exclusive of New York City, Buffalo, and Rochester), 1929–30. (Scales are so made that the rate for all ages under 15 years represents an interval on the vertical scale that corresponds to approximately 10 years on the horizontal scale.)

TABLE 21.—*Annual incidence of diphtheria among males and females of specific ages—canvassed white families in 18 States during 12 consecutive months, 1928–31*

Age in years	Annual case rate per 1,000			Number of cases			Population (years of life)		
	Both sexes [1]	Male	Female	Both sexes [1]	Male	Female	Both sexes [1]	Male	Female
All ages [1]	1.82	1.96	1.68	70	37	33	[1] 38,544	[1] 18,896	[1] 19,627
All ages under 15	3.55	4.16	2.93	56	33	23	15,796	7,929	7,846
Under 2	1.33			3			2,251		
2–3	4.25	[2] 2.96	[2] 1.90	9	[2] 5	[2] 3	2,116	[2] 1,691	[2] 1,583
4–5	5.18	[3] 6.57	[3] 2.92	12	[3] 11	[3] 5	2,318	[3] 1,675	[3] 1,715
6–7	5.58			13			2,329		
8–9	4.52	5.31	4.82	10	12	11	2,214	2,262	2,281
10–14	1.97	2.17	1.76	9	5	4	4,568	2,301	2,267
15–19	1.64	1.31	1.97	5	2	3	3,050	1,527	1,523
20–34	.77			6			7,759		
35 and over	.26	.21	.69	3	2	7	11,752	9,361	10,150

[1] "All ages" includes some of unknown age; "both sexes" includes some of unknown sex.
[2] Under 3 years.
[3] 3–5 years.

Data for Alabama and Michigan (table 23) are available by sex and age. In figure 10 rates are plotted by sex in 5- and 10-year age groups. Again a definite difference appears between the southern and northern State, with a greater concentration of cases in the younger ages in Alabama than in Michigan. This phenomenon has been discussed by both Doull (*21*) and Dauer (*19*).

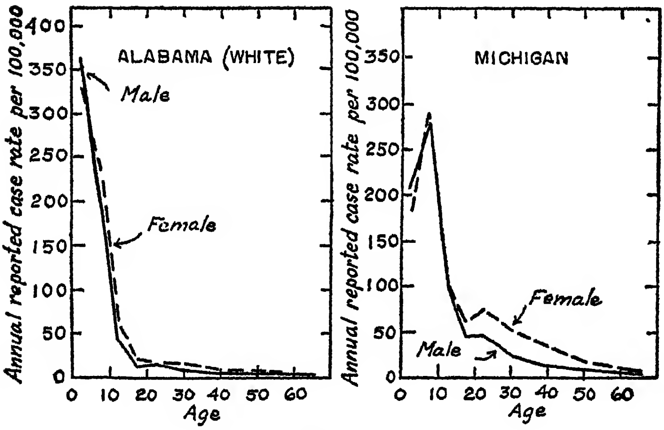

FIGURE 10.—Diphtheria incidence at specific ages (5- and 10-year groups) for each sex, based on cases reported to health departments of Alabama and Michigan. (Scales are so made that the rate for all ages of both sexes represents an interval on the vertical scale that corresponds to approximately 20 years on the horizontal scale.)

TABLE 22.—*Age incidence of diphtheria in Alabama, New York,*[1] *and Connecticut—based on cases reported to health departments,*[2] *1929–30*

Age in years	Annual case rate per 100,000					Number of cases reported in the 2 years				
	Alabama (white)			Both sexes		Alabama (white)			Both sexes	
	Both sexes	Male	Female	New York	Connecticut	Both sexes	Male	Female	New York	Connecticut
All ages	83.9	81.5	86.4	25.9	54.5	[3] 2,855	[3] 1,398	[3] 1,457	2,464	[3] 1,752
All ages under 15	208.8	206.2	211.4	71.9	142.8	2,565	1,289	1,276	1,774	1,272
Under 1	130.9	167.2	93.1	34.2	80.8	106	69	37	49	40
1	311.5	346.9	274.5	68.7	47.6	246	140	106	100	24
2	399.3	430.8	366.6	82.8	235.6	333	183	150	130	128
3	437.8	451.1	424.1	98.0	205.2	379	198	181	157	114
4	435.5	402.6	469.7	103.4	194.7	357	168	189	165	109
5	284.8	272.8	297.0	111.5	212.4	245	119	126	188	126
6	366.5	313.0	421.9	115.6	230.6	315	137	178	104	137
7	193.0	187.4	198.7	97.6	165.5	160	79	81	166	99
8	145.7	153.3	137.9	75.3	187.0	129	69	60	133	119
9	103.1	93.1	113.4	77.4	127.3	87	40	47	135	80
Under 5	345.0	361.4	327.9	78.5	156.1	1,421	758	663	601	415
5–9	218.8	204.1	233.9	95.2	183.9	936	444	492	816	561
10–14	53.5	44.0	63.4	42.3	92.5	208	87	121	357	296
15–19	16.0	11.9	20.1	20.7	38.8	59	22	37	103	115
20–24	15.1	14.6	15.5	18.3	34.5	49	23	26	137	91
25–34	11.4	5.5	17.1	13.8	22.5	55	13	42	195	109
35–44	6.6	5.3	7.8	6.8	[4] 12.5	25	10	15	97	[4] 85
45–54	4.9	4.3	5.6	4.8	[5] 2.2	15	7	8	55	[5] 13
55 and over	1.6	1.9	1.3	2.8		5	3	2	43	

[1] Exclusive of New York City, Buffalo, and Rochester.
[2] Data from annual reports of the respective State health departments (*10, 12, 16*).
[3] "All ages" includes some of unknown age.
[4] 35–49.
[5] 50 and over.

TABLE 23.—*Age incidence of diphtheria in Michigan, California, and Mississippi—based on cases reported to health departments,*[1] *1929–30*

Age in years	Annual case rate per 100,000					Number of cases reported in the 2 years				
	Michigan			Both sexes		Michigan			Both sexes	
	Both sexes	Male	Female	California	Mississippi (white)	Both sexes	Male	Female	California	Mississippi (white)
All ages [2]	80.8	74.6	87.5	53.7	121.8	[2] 7,821	[2] 3,760	[2] 4,064	[2] 6,003	2,429
All ages under 15	197.8	200.9	194.6	166.2	316.4	5,562	2,864	2,698	4,305	2,211
Under 5	197.5	210.7	183.8	166.0	438.0	1,831	995	836	1,346	1,020
5–9	284.5	281.6	287.6	228.0	404.1	2,771	1,390	1,381	2,122	984
10–14	105.4	104.2	106.6	98.7	93.1	960	479	481	837	207
15–19	54.0	44.9	62.8	41.3	30.3	449	188	261	354	65
20–24	60.1	45.4	75.3	32.7	27.5	503	193	310	311	52
25–34	37.6	24.7	52.0	23.1	17.1	608	210	398	452	48
35–44	22.3	12.8	33.7	13.5	15.2	326	102	224	251	35
45–54	13.2	9.1	17.9	5.5	6.6	131	49	82	80	12
55 and over	4.3	2.9	5.7	3.0	8.0	48	17	31	49	6

[1] Data from annual reports of the respective State health departments (*11, 14, 15*).
[2] "All ages" includes some of unknown age.

In the adult ages the rates for females are definitely higher than for males, particularly in Michigan. The difference between the sexes presumably reflects the greater exposure to the disease by mothers who act as nurses for their children with diphtheria.

The concentration of diphtheria cases in the very early ages in Alabama and presumably in other southern States (see data for Mississippi in table 23) suggests that in the South effective protection against diphtheria calls for immunization at earlier ages than would be reasonably effective in the North, where the peak incidence occurs later.

TABLE 24.—*Annual diphtheria mortality and morbidity in the general population of four geographic sections of the United States, 1929–30, as reported to the health departments of all States and of the States sampled in the survey*

Geographic section [1]	Annual death rate per 100,000		Annual reported case rate per 100,000		Number of deaths in the 2 years		Number of cases reported in the 2 years		Number of States [3]	
	Surveyed States	All States	Surveyed States	All States	Surveyed States	All States	Surveyed States	All States	Surveyed States	All States
All sections	5.04	5.74	61.4	61.9	6,720	14,085	81,766	151,941	[3] 18	[3] 49
Northeast [1]	4.18	5.37	69.2	73.1	1,543	3,696	25,534	50,313	3	9
North Central [1]	5.38	[2] 4.98	61.4	57.8	3,200	[2] 3,841	36,546	44,195	7	[2] 12
South [1]	7.03	[4] 7.51	56.7	61.0	1,429	[4] 5,687	11,531	46,182	5	[3, 4] 17
White	7.47	8.45	([5])	([5])	1,153	3,951	([5])	([5])	5	16
Colored	5.63	5.40			276	934			5	16
West [1]	3.31	3.62	49.8	47.8	548	861	8,155	11,251	3	11

[1] The 4 sections in terms of the U. S. Census geographic areas and their diphtheria death rates in 1929–30 were as follows:
Northeast: New England (4.38) and Middle Atlantic (5.68).
North Central: East North Central (5.86) and West North Central (3.29).
South: South Atlantic (7.02), East South Central (8.59), and West South Central (7.27).
West: Mountain (4.47) and Pacific (3.23).
[2] South Dakota was not in the registration area in 1929; deaths were obtained from State reports.
[3] The District of Columbia is counted as a State.
[4] Texas deaths from State reports are included in the total but are not available by color.
[5] Cases not available by color.

DIPHTHERIA MORTALITY AND CASE FATALITY AT SPECIFIC AGES

In continental United States 151,941 cases (white and colored) of diphtheria were reported in the 2 years 1929 and 1930, an annual incidence of 61.9 per 100,000. A total of 14,085 deaths registered [15] gives an annual mortality of 5.74 per 100,000 and a case fatality of 9.3 percent, a figure that is no doubt too high because of the incompleteness of case reporting (table 24). To express it in another way, there were 10.8 cases reported for each death registered. In a group of 81 cities (*17*) with populations over 100,000 where reporting is probably better but still incomplete, the average annual case rate for 1929-30 was 91.6 per 100,000, and the death rate was 6.45 per 100,000, with a case fatality of 7.0 percent, or 14.2 cases reported for each death registered. Green and Moorehouse (*23*) found for Cleveland a case fatality of 6.8 percent by excluding from the computation all deaths that had not been previously reported as cases. Wood (*30*), in studies in Pennsylvania, found a case fatality of 6.6 percent, and an earlier study (*18*) from this office indicated a case fatality of 7.0 percent for cases under 15 years of age.

Diphtheria mortality varies considerably in different sections of the country. Table 24 shows for 1929–30 death rates and reported case rates for four broad geographic regions, with death rates for white and colored shown separately in the South. In these years the death rate was lowest in the Western region; the rates in the Northeast and North Central States were approximately the same, but the South showed a higher rate than any other region. The diphtheria rate among colored persons, like many of the other communicable diseases of childhood, was less than among whites.

Table 25 and figure 11 show diphtheria mortality by age and sex in the white population of the registration States. The peak of mortality comes at an earlier age than the maximum case incidence. For both sexes combined the peak mortality occurs at 2 years of age, and among males it occurs at 1 year. After the peak, the decline is rapid with nearly all of the deaths occurring under 15 years of age.

The high mortality at the very early ages again emphasizes the necessity for early immunization if it is to be effective in preventing diphtheria deaths.

Among children under 5 years the mortality of males is somewhat above that of females, but among adults the reverse is true. A higher case rate for adult women has already been noted.

Table 26 shows case fatality rates for persons of specific ages in five States. The variation from State to State is no doubt due in part to the incompleteness of reporting of cases. The purpose of

[15] Mortality Statistics (*9*) supplemented by State reports (*17*) for South Dakota in 1929 and Texas in 1929 and 1930.

the table is to show the relative case fatality at different ages rather than to compare States. In figure 12 these rates are plotted (single years to 5) for Alabama and New York State. The percentage of cases that end fatally is higher for infants under 1 year than at any other age. Although there is a definite decline in case fatality as age increases, the decrease is not as rapid for diphtheria as for the other diseases of childhood (*18*).

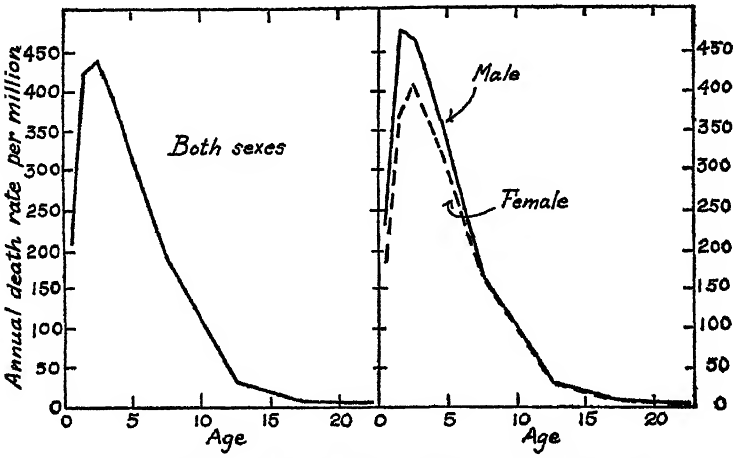

FIGURE 11.—Diphtheria mortality at specific ages (single years to 5) for each sex—white population in the registration States, 1929–30. (Scales are so made that the rate for all ages under 15 years represents an interval on the vertical scale that corresponds to approximately 10 years on the horizontal scale.)

TABLE 25.—*Annual diphtheria mortality at specific ages for each sex—white persons in the registration States,[1] 1929–30*

Age in years	Annual death rate per million			Number of deaths in the 2 years		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages [2]	57.4	59.4	55.3	11,957	6,268	5,689
All ages under 15	183.9	193.9	173.5	11,030	5,902	5,128
Under 1	208.4	232.0	183.9	753	427	326
1	425.4	478.8	369.9	1,531	878	653
2	442.2	472.6	410.7	1,704	926	778
3	395.2	419.8	370.0	1,561	841	720
4	344.9	362.0	327.2	1,352	723	629
Under 5	364.4	393.9	333.9	6,901	3,795	3,106
5–9	167.2	167.9	166.6	3,496	1,780	1,716
10–14	31.4	32.1	30.8	633	327	306
15–19	9.1	8.6	9.6	175	83	92
20–24	6.6	5.8	7.4	120	52	68
25–34	6.0	4.6	7.3	190	73	117
35–44	5.3	3.3	7.4	157	50	107
45–54	6.1	4.2	8.1	138	50	88
55–64	5.9	4.6	7.3	89	36	53
65–74	4.3	3.2	5.3	37	14	23
75 and over	5.0	3.7	6.1	17	6	11

[1] Registration States included all except Texas and South Dakota in 1929 and all except Texas in 1930.
[2] "All ages" includes a few of unknown age.

TABLE 26.—*Variation with age and sex in the case fatality of diphtheria in five States* [1]—*Based on cases reported to health departments and total deaths registered, 1929–30*

Age in years	Deaths per 100 reported cases					Annual death rate per million population					Number of deaths in the 2 years				
	Alabama (white)	New York [2]	Michigan	California	Mississippi (white)	Alabama (white)	New York [2]	Michigan	California	Mississippi (white)	Alabama (white)	New York [2]	Michigan	California	Mississippi (white)
All ages:															
Both sexes	12.4	8.7	10.2	6.3	9.1	104.4	22.6	82.6	33.6	111.4	355	215	800	381	[3] 222
Male	12.9	(4)	11.3	(4)	(4)	105.0	21.7	84.0	37.2	113.9	180	104	423	219	115
Female	12.0		9.3			103.8	23.5	81.1	29.6	108.8	175	111	377	162	107
Both sexes:															
All ages under 15	13.6	10.0	12.8	7.8	9.9	284.9	72.1	253.2	129.4	313.4	350	178	712	335	219
Under 1	29.2	26.5	(5)	(5)	(5)	382.7	90.6	184.7	150.7	249.0	31	13	33	23	11
1	27.2	23.0				848.4	158.0	338.2	197.0	848.5	67	23	60	30	37
2	19.5	20.0				779.4	165.6	415.5	299.7	888.9	65	26	79	49	42
3	18.2	16.6				797.0	162.2	473.7	236.0	754.6	69	26	91	40	38
4	13.7	9.7				597.8	100.3	376.5	202.5	611.0	49	16	71	35	29
Under 5	19.8	17.3	18.2	13.2	15.4	682.2	135.8	360.3	218.3	674.2	281	104	334	177	157
5–9	7.1	7.7	11.6	6.3	5.9	154.3	73.5	329.6	142.9	238.2	66	63	321	133	58
10–14	1.4	3.1	5.9	3.0	1.9	7.7	13.0	62.6	29.5	18.0	3	11	57	25	4
15–19	2.4	2.5	4.2	2.3	0.9	2.3	5.1	22.8	9.3	1.5	5	4	19	8	2
20–34		3.6	3.2	1.8			5.5	14.3	4.8			12	35	14	
35–54		4.6	5.9	4.8			2.7	11.0	4.8			7	27	16	
55 and over		32.6	14.6	16.3			9.2	6.2	4.8			14	7	8	

[1] Cases from the annual reports of the respective State health departments (see tables 22, 23); deaths from Mortality Statistics for the United States (9).
[2] Exclusive of New York City, Buffalo, and Rochester.
[3] "All ages" includes some of unknown age.
[4] Cases not available by sex.
[5] Cases not available by single years of age.

REACTIONS FOLLOWING IMMUNIZATION

Of the 487 diphtheria immunizations, only 6, or 1.2 percent, were reported as being accompanied by reactions of sufficient severity to cause loss of time from school or other usual activities or to result in a consultation with a doctor.[16] The figure of 1.2 percent of the diphtheria immunizations with reactions that caused disability may be compared with 6.0 percent for smallpox vaccinations and 1.2 percent for typhoid immunizations.

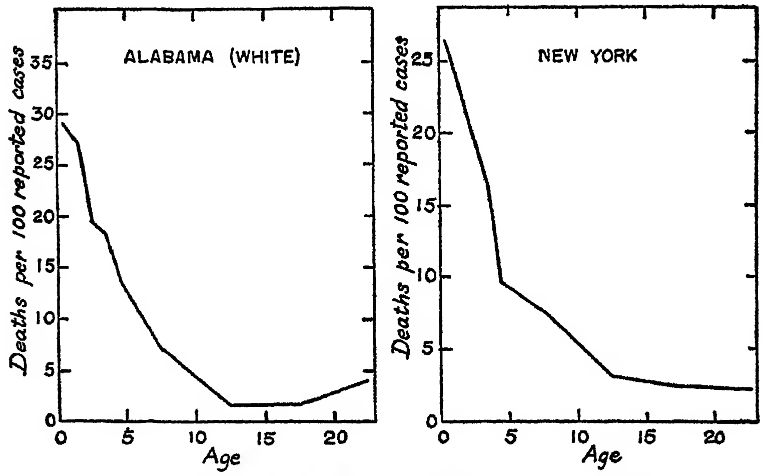

FIGURE 12.—Variation with age (single years to 5) in the case fatality of diphtheria—deaths per 100 reported cases in Alabama and New York (exclusive of New York City, Buffalo, and Rochester), 1929–30. (Scales are so made that the rate for all ages under 15 years represents an interval on the vertical scale that corresponds to approximately 10 years on the horizontal scale.)

WHERE IMMUNIZATIONS WERE DONE

Of the 487 diphtheria immunizations during the study year, 57 percent were done in public clinics or by school physicians. This figure may be compared with 52 percent for typhoid immunizations, 42 percent for smallpox vaccinations, 36 percent for scarlet fever immunizations, and 3 percent of cases given cold vaccine. Of all diphtheria immunizations done in public clinics, 90 percent were free and the others paid a nominal or a full-price fee.

The percentage of diphtheria immunizations that were done in public clinics increases from 54 percent under 5 years to 59 at 5–9, and 71 at 10–14 years. Only six immunizations were done above 15 years. Of all diphtheria immunizations 4.9 percent were reported as done by specialists and 7.4 percent had a visiting nurse on the case, presumably to urge immunization.

[16] In 4 reactions there was a report of 1 or more days in bed, but in the other 2 cases consultation with a doctor subsequent to the injections was the only basis for classifying the person as being sick.

IV. SUMMARY

Information on the history of artificial diphtheria immunizations and cases at any time and more detailed records of diphtheria immunizations during a 12-month period between 1928 and 1931 were obtained on 8,758 white families in 130 localities in 18 States. Each family was visited at intervals of 2 to 4 months to secure the data.

The surveyed families include representation from nearly all geographic sections, from rural, urban, and metropolitan areas, from all income classes, and of both native- and foreign-born persons. The proportions of these various elements included are not identical with those in the population of the United States, but the variations are not generally large. In other respects, also, the surveyed group is not dissimilar to families in the general white population of the United States.

Considering the whole group, 43 percent of 9-year old children gave a history of an artificial diphtheria immunization; above this age the percentage declined until at 20–24 years only 5 percent gave such a history. At 20–24 years, about 7 percent gave a history of an attack of diphtheria (fig. 1).

Boys and girls show about the same percentages with a history of diphtheria immunization. Boys under 10 years gave more histories of attacks than girls (fig. 2).

In the Northeast and the South the percentages of persons with a history of diphtheria immunization were somewhat higher than in the North Central and Western regions. The South was also high in histories of attacks, but the Northeast was low (fig. 3).

Histories of diphtheria immunization in the localities here studied were as frequent in rural as in urban places. Histories of diphtheria attacks were most frequent in large cities and least frequent in rural areas (fig. 4). This situation was true for each of four broad geographic sections (fig. 5).

Artificial diphtheria immunizations during the 12 months of the morbidity study amounted to 30.5 per 1,000 children under 15 years (fig. 6).

The frequency of diphtheria immunizations of children of the preschool ages increases regularly with family income; in the school ages the frequency of immunizations does not show any consistent relation to income (fig. 7).

About half of the diphtheria immunizations during the study year were done in 15 percent of the localities.

The peak of diphtheria case incidence occurs at a younger age in the South than in the North (fig. 9).

The peak of diphtheria mortality in the registration States occurs at 2 years of age (fig. 11). The maximum diphtheria case fatality occurs among infants under 1 year of age (fig. 12).

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SPOTTED FEVER, EASTERN TYPE, ON VESSEL ARRIVING AT LOS ANGELES HARBOR

The S. S. *Hollywood* arrived at Los Angeles harbor (San Pedro) on December 5, 1936, from South American ports with two cases of illness on board at first suspected to be typhus fever but later diagnosed by the Los Angeles health department as spotted fever, eastern type. The patients were taken to the Los Angeles County Hospital, where they were placed in isolation. A third patient was landed from the *Hollywood* by a Coast Guard boat at San Diego. This patient died, and the case was diagnosed as pneumonia, but it is believed that it also was spotted fever.

The *Hollywood* left Buenos Aires on October 16, and touched at Santos October 22, Rio de Janeiro October 27, Bahia November 2, Para November 12, Barbados November 17, Trinidad November 18, and Balboa November 23. The first case occurred on October 31 and the last on November 19. The vessel is now in Los Angeles harbor, where it will probably remain throughout the duration of the seamen's strike. Up to December 11 no further cases had been reported among the contacts.

COURT DECISION ON PUBLIC HEALTH

City held liable for death caused by contaminated water supply.—(Vermont Supreme Court; *Boguski* v. *City of Winooski*, 187 A. 808; decided Nov. 4, 1936.) The defendant city at one time maintained a valve connection between the city water supply and a nearby river in order to assure an adequate supply of water in the event of an unusual fire. Somehow this valve was left open, thereby permitting the river water to flow into the mains which carried the water for domestic use. One Joseph Boguski contracted a case of typhoid fever which was fatal. The plaintiff, his administrator, brought this action against the defendant city, alleging that the deceased contracted typhoid by drinking from the city's water supply. In addition to proving that the river water was carried into the domestic water supply, evidence was introduced to show that the river water was polluted with colon bacilli; that typhoid bacilli are to be expected where colon bacilli are found; that milk, fruit, or shellfish could not have caused the infection in the deceased; and that at least seven of the other cases of typhoid in the city could have been caused by drinking the polluted water of the city system. On the basis of this evidence the judgment in the lower court was rendered for the plaintiff, and on appeal this judgment was affirmed by the supreme court.

The court found that the circumstantial evidence presented was sufficient to send the case to the jury, although it had not been shown by direct evidence that the river water was polluted with typhoid bacilli. The court in the course of its opinion said:

> * * * The question here in issue becomes a close one, only when we have to say whether enough appears in the record to charge the Winooski River with the responsibility for the pollution. It seems clear to us that the jury was well justified in its inference that the river was the responsible agency. Not only was the inference a logical one, but it seems difficult to see how any other could have been drawn from the facts disclosed.

DEATHS DURING WEEK ENDED NOV. 28, 1936

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 28, 1936	Corresponding week, 1935
Data from 86 large cities of the United States:		
Total deaths	8, 259	7, 939
Deaths per 1,000 population, annual basis	11. 5	11. 1
Deaths under 1 year of age	485	499
Deaths under 1 year of age per 1,000 estimated live births	44	46
Deaths per 1,000 population, annual basis, 48 weeks of year	12.0	11. 3
Data from industrial insurance companies:		
Policies in force	68, 752, 035	67, 800, 258
Number of death claims	10, 421	9, 984
Death claims per 1,000 policies in force, annual rate	7. 9	7. 7
Death claims per 1,000 policies, 48 weeks of year, annual rate	9. 7	9. 5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 5, 1936, and December 7, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 5, 1936, and Dec. 7, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 5, 1936	Week ended Dec 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935
New England States:								
Maine	5	1			33	358	1	0
New Hampshire					2		0	0
Vermont		3				21	0	0
Massachusetts	4	13			282	80	3	1
Rhode Island	1				147	78	0	0
Connecticut	4	9	4	9	75	110	1	0
Middle Atlantic States:								
New York	33	52	[1] 7	[1] 13	224	496	8	8
New Jersey	11	23	12	20	33	16	2	2
Pennsylvania	72	81			45	109	8	2
East North Central States:								
Ohio	84	77	4	11	10	72	5	2
Indiana	20	77	33	36	12	24	4	5
Illinois	25	93	22	33	19	82	8	7
Michigan	38	26	4	5	21	32	2	3
Wisconsin	6	2	27	54	44	70	0	1
West North Central States:								
Minnesota	7	6	1		15	57	0	2
Iowa	2	18			6	3	2	1
Missouri	29	49	58	136	7	8	8	8
North Dakota	5	2	11	8		5	0	0
South Dakota		2			1	4	0	0
Nebraska	5	4			2	30	2	1
Kansas	16	18	1	9	14	4	1	5
South Atlantic States:								
Delaware	3				9	111	0	0
Maryland [2]	19	19	14	11	84	20	6	6
District of Columbia	13	33	2	3	7	3	2	2
Virginia	57	48			30	27	8	5
West Virginia	26	35	24	33	15	4	8	3
North Carolina [3]	102	73	2	13	21	5	1	2
South Carolina [3]	16	6	381	228	24		2	0
Georgia [3]	30	27		57			1	0
Florida [3]	11	19	1	2	3		0	0
East South Central States:								
Kentucky	35	48	15	34	3	6	7	4
Tennessee [3]	40	38	68	59	1	2	0	3
Alabama [3]	29	35	82	130	2	13	3	1
Mississippi [2] [3]	12	15					1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 5, 1936, and Dec. 7, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935
West South Central States:								
Arkansas	10	20	24	54	--------	2	0	1
Louisiana [3]	30	33	5	7	1	34	0	0
Oklahoma [4]	11	24	69	23	8	1	1	0
Texas [3]	152	123	631	173	78	4	9	6
Mountain States:								
Montana	3	2	4	12	4	5	1	0
Idaho [5]	1	--------	1	1	104	7	0	1
Wyoming	--------	1	--------	2	1	6	0	0
Colorado	7	6	--------	--------	2	8	4	1
New Mexico	7	3	1	--------	13	2	1	1
Arizona	6	9	65	27	28	2	3	1
Utah [2]	1	--------	4	--------	20	--------	1	0
Pacific States:								
Washington	2	3	--------	2	7	128	1	3
Oregon	--------	1	41	15	11	248	1	2
California	53	22	83	29	27	241	4	3
Total	993	1,199	1,701	1,249	1,495	2,488	110	88
49 weeks of year	26,741	35,372	151,539	114,129	279,485	713,558	7,097	5,243

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935
New England States:								
Maine	0	11	11	84	0	0	0	6
New Hampshire	0	1	1	6	0	0	0	0
Vermont	0	1	14	14	0	0	0	0
Massachusetts	0	5	129	250	0	0	1	1
Rhode Island	0	1	28	20	0	0	2	0
Connecticut	0	2	44	33	0	0	1	1
Middle Atlantic States:								
New York	2	10	400	553	0	0	9	7
New Jersey	1	4	72	110	0	0	1	3
Pennsylvania	3	5	438	519	0	0	35	6
East North Central States:								
Ohio	7	2	285	429	0	0	13	4
Indiana	0	0	197	289	3	1	2	3
Illinois	6	1	343	512	1	9	13	10
Michigan	4	0	406	291	0	1	5	1
Wisconsin	0	1	197	389	7	5	1	6
West North Central States:								
Minnesota	0	0	140	208	4	4	2	0
Iowa	1	1	92	181	10	10	0	15
Missouri	1	2	139	132	3	2	16	5
North Dakota	0	0	43	84	12	1	0	2
South Dakota	0	0	55	67	15	21	3	1
Nebraska	1	0	42	132	0	66	0	1
Kansas	0	0	196	174	10	10	2	5
South Atlantic States:								
Delaware	0	0	10	14	0	0	3	1
Maryland [2]	1	0	87	88	0	0	3	8
District of Columbia	0	0	20	12	0	0	6	2
Virginia	2	1	61	45	0	0	7	9
West Virginia	0	0	52	101	0	0	6	1
North Carolina [3]	3	5	68	87	0	1	12	3
South Carolina [3]	1	2	6	8	0	0	5	1
Georgia [3]	1	0	35	26	3	0	8	18
Florida [3]	0	0	13	5	0	0	0	3
East South Central States:								
Kentucky	1	2	54	59	0	0	9	11
Tennessee [3]	4	3	37	74	0	0	11	7
Alabama [3]	3	0	30	16	0	0	6	2
Mississippi [2] [3]	1	0	19	29	1	0	7	15

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 5, 1936, and Dec. 7, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935	Week ended Dec. 5, 1936	Week ended Dec. 7, 1935
West South Central States:								
Arkansas	2	0	7	14	1	0	5	8
Louisiana [4]	3	2	9	19	1	0	7	12
Oklahoma [4]	4	1	16	23	0	2	3	8
Texas [3]	7	4	190	64	1	1	42	17
Mountain States:								
Montana	0	0	37	159	25	70	3	0
Idaho [5]	0	0	36	43	1	0	2	2
Wyoming	0	0	17	141	0	2	1	0
Colorado	0	0	27	130	0	46	0	0
New Mexico	1	0	17	35	0	0	9	11
Arizona	0	0	12	24	0	0	3	0
Utah [2]	0	0	19	74	0	0	0	0
Pacific States:								
Washington	1	1	57	85	2	50	3	2
Oregon	0	0	40	63	14	2	2	5
California	7	6	220	289	4	5	11	7
Total	68	74	4,408	6,194	118	309	280	225
49 weeks of year	4,360	10,574	220,782	233,342	6,941	6,994	14,137	16,964

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Dec. 5, 1936, 49 cases, as follows: North Carolina, 2; South Carolina, 2; Georgia, 13; Florida, 2; Tennessee, 1; Alabama, 6; Mississippi, 3; Louisiana, 1; Texas, 19.
[4] Exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended Dec. 5, 1936, Idaho, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1936										
Kentucky	14	130	52	19	145		19	208	0	137
November 1936										
Arkansas	2	46	118	124	1		25	50	1	35
Connecticut		10	13		178		2	159	0	4
Delaware	1	4		2	22		0	23	0	4
District of Columbia	8	71	5		11		0	46	0	2
Florida	3	34	10	234	1	1	7	21	0	2

October 1936

	Cases
Kentucky:	
Mumps	62
Undulant fever	12
Whooping cough	123

November 1936

	Cases
Actinomycosis:	
Connecticut	1
Chicken pox:	
Arkansas	16
Connecticut	415
Delaware	75
District of Columbia	37
Florida	16
Conjunctivitis:	
Connecticut	3
Dengue:	
Florida	1
Dysentery:	
Connecticut (bacillary)	8
District of Columbia (bacillary)	3
Florida	4
Encephalitis, epidemic or lethargic.	
Connecticut	1
German measles:	
Connecticut	20
Mumps:	
Arkansas	6
Connecticut	250
Delaware	8
Florida	25
Paratyphoid fever:	
Connecticut	9
Septic sore throat:	
Connecticut	6
Tetanus:	
Connecticut	1
Trachoma:	
Connecticut	2
Tularaemia:	
District of Columbia	1
Typhus fever:	
Florida	1
Undulant fever:	
Arkansas	6
Connecticut	8
Florida	2
Whooping cough:	
Arkansas	19
Connecticut	448
Delaware	31
District of Columbia	84
Florida	16

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 28, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	6	0	0	1	0	1	27
New Hampshire:											
Concord	0	------	0	0	0	6	0	0	0	0	10
Manchester	0	------	0	0	1	3	0	0	0	0	15
Nashua	3	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	0	0	0	1	0	0	3
Burlington	0	------	0	0	0	0	0	0	0	0	4
Rutland	0	------	0	0	0	1	0	0	0	0	7
Massachusetts:											
Boston	0	------	0	5	13	32	0	9	0	151	225
Fall River	0	------	0	0	2	1	0	0	0	0	------
Springfield	0	------	0	1	0	2	0	0	0	9	23
Worcester	1	------	0	3	4	6	0	3	0	22	51
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	14
Providence	3	------	0	0	3	13	0	3	2	10	58
Connecticut:											
Bridgeport	0	------	0	7	3	0	0	1	0	1	41
Hartford	0	------	0	1	4	11	0	0	0	0	51
New Haven	0	------	0	0	1	2	0	2	0	4	42
New York:											
Buffalo	0	------	0	20	12	15	0	3	0	18	153
New York	19	11	2	47	104	95	0	82	3	70	1,449
Rochester	2	------	1	0	7	3	0	0	0	3	64
Syracuse	0	------	0	0	7	9	0	1	0	15	62
New Jersey:											
Camden	1	------	3	0	4	5	0	0	0	4	29
Newark	0	1	0	7	7	1	0	2	0	31	110
Trenton	0	------	1	0	2	2	0	1	0	1	26
Pennsylvania:											
Philadelphia	5	4	4	9	28	81	0	25	2	131	421
Pittsburgh	8	------	3	0	26	30	0	8	0	23	180
Reading	1	------	1	2	5	3	0	0	0	16	40
Scranton	1	------	------	0	------	1	0	------	0	0	------
Ohio:											
Cincinnati	5	------	4	1	9	5	0	10	1	16	138
Cleveland	3	8	4	2	17	38	0	15	1	39	194
Columbus	0	1	1	0	3	10	0	1	0	6	75
Toledo	1	1	1	0	2	5	0	2	1	15	47
Indiana:											
Anderson	0	------	0	1	1	2	0	1	0	1	7
Fort Wayne	1	------	0	0	2	12	0	0	0	0	24
Indianapolis	0	------	0	2	18	13	0	2	0	4	94
Muncie	0	------	0	1	0	1	0	0	0	0	16
South Bend	0	------	0	0	3	1	0	0	0	4	12
Terre Haute	2	------	0	0	0	4	0	0	0	0	23

City reports for week ended Nov. 28, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Illinois:											
Alton	0		0	0	0	2	0	0	0	0	4
Chicago	6	4	1	8	44	151	0	41	0	55	659
Elgin	0		0	0	2	0	0	0	0	10	11
Moline	0		0	0	1	0	0	0	0	10	9
Springfield	3		0	0	0	0	0	0	0	15	15
Michigan:											
Detroit	11	4	2	7	18	90	0	18	3	72	274
Flint	1		0	0	3	6	0	1	0	10	26
Grand Rapids	0		0	1	6	12	0	1	0	15	34
Wisconsin:											
Kenosha	0		0	0	1	5	0	0	0	2	5
Madison	0			0		4	0		0	3	21
Milwaukee	1	1	1	6	3	32	0	2	0	36	86
Racine	0		0	1	1	11	0	0	0	1	15
Superior	0		0	0	2	1	0	0	0	0	10
Minnesota:											
Duluth											
Minneapolis	6		1	2	3	13	0	1	0	9	92
St. Paul	0		0	2	11	18	0	1	0	3	60
Iowa:											
Cedar Rapids	0			1		1	0		0	0	
Davenport	0			0		2	0		0	0	
Des Moines	0			0		10	0		0	0	33
Sioux City	0			0		5	1		0	1	
Waterloo	0			0		2	1		0	6	
Missouri:											
Kansas City	2		0	0	9	17	0	5	2	6	96
St. Joseph	1		0	0	6	6	2	1	0	0	26
St. Louis	9		0	3	13	30	0	7	0	17	197
North Dakota:											
Fargo	0		0	0	1	1	0	0	0	1	9
Grand Forks	0			1		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	7
South Dakota:											
Aberdeen	0			0		8	0		0	0	
Sioux Falls	0		0	0	0	1	0	0	0	0	10
Nebraska:											
Omaha	0		0	0	2	3	0	0	0	3	42
Kansas:											
Lawrence	0		1	0	1	0	0	0	0	0	23
Topeka	0		0	1	2	7	0	0	0	0	13
Wichita	9		0	1	0	7	0	0	0	2	20
Delaware:											
Wilmington	0		0	0	3	0	0	0	0	5	42
Maryland:											
Baltimore	6	4	1	56	21	20	0	6	1	80	224
Cumberland	0		0	1	1	2	0	0	0	0	11
Frederick	0		0	0	0	0	0	0	0	0	5
Dist. of Col.:											
Washington	14	1	0	2	16	12	0	11	0	14	179
Virginia:											
Lynchburg	2		0	0	2	1	0	1	0	3	14
Norfolk	0		0	0	4	3	0	1	0	0	20
Richmond	1		0	0	1	8	0	2	0	1	49
Roanoke	2		0	0	2	1	0	0	1	0	14
West Virginia:											
Charleston	1	2	0	0	3	0	0	1	0	0	36
Huntington	2			0		4	0		0	0	
Wheeling	0		0	1	2	1	0	1	0	1	8
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh	1		0	0	2	1	0	2	0	0	21
Wilmington	0		0	0	4	0	0	0	0	0	12
Winston-Salem	1		0	1	2	2	0	3	0	0	16
South Carolina:											
Charleston	5	22	0	0	2	3	0	1	0	0	20
Columbia	0		1	0	3	0	0	1	0	0	23
Florence	1		0	0	0	0	0	0	0	0	2
Georgia:											
Atlanta	6	19	3	0	10	10	0	3	1	1	83
Brunswick	0		0	0	1	0	0	0	0	0	6
Savannah	1	27	0	1	2	3	0	1	1	1	24
Florida:											
Miami	0	2	1	0	1	0	0	1	0	1	37
Tampa	0		0	0	1	1	0	0	0	0	26

City reports for week ended Nov. 28, 1936—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Kentucky:											
Ashland	1		0	0	0	1	0	0	1	0	0
Covington	0		0	0	0	2	0	0	0	0	8
Lexington	0		0	0	2	0	0	1	0	0	21
Tennessee:											
Knoxville	4	1	0	0	3	1	0	2	2	0	20
Memphis	1		2	0	6	7	0	5	0	4	82
Nashville	1		0	1	3	2	0	0	0	1	43
Alabama:											
Birmingham	5	5	2	0	4	3	0	5	0	0	72
Mobile	0	2	1	0	1	4	0	0	0	0	28
Montgomery	1			6		0	0		0	0	
Arkansas:											
Fort Smith	0			0		3	0		0	0	
Little Rock	0		0	0	2	0	0	1	0	0	6
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	4
New Orleans	1	7	2	0	23	4	0	7	3	0	163
Shreveport	0		0	0	4	2	0	0	0	0	39
Oklahoma:											
Oklahoma City	2		2	0	6	1	1	0	0	0	38
Tulsa	0			0		1	0		0	0	
Texas:											
Dallas	5		0	0	11	22	0	1	0	1	62
Fort Worth	2		0	15	1	11	1	0	0	0	38
Galveston	1		0	0	3	3	0	2	0	0	22
Houston	9		1	3	6	12	0	8	3	0	81
San Antonio	1		1	0	12	0	0	3	0	1	83
Montana:											
Billings	0		0	0	0	2	0	0	0	0	7
Great Falls	0		0	0	2	0	0	0	0	2	5
Helena	0		0	0	0	1	0	0	0	0	3
Missoula	0		0	2	0	0	0	0	0	0	8
Idaho:											
Boise	0		0	0	0	1	0	1	0	0	5
Colorado:											
Colorado Springs	0		0	0	2	0	0	2	0	0	13
Denver	6		1	6	6	8	0	2	0	21	83
Pueblo	1		0	0	3	3	0	0	0	0	11
New Mexico:											
Albuquerque	0		0	0	1	2	0	6	0	0	14
Utah:											
Salt Lake City	0		0	1	7	11	0	1	0	6	40
Nevada:											
Reno											
Washington:											
Seattle	0		1	2	6	5	0	1	0	2	92
Spokane	0		0	0	6	10	0	0	0	0	32
Tacoma	0		0	0	2	2	0	0	0	0	20
Oregon:											
Portland	0		0	0	9	5	0	0	1	9	88
Salem	0			0		1	0		0	1	
California:											
Los Angeles	19	11	2	4	17	35	8	16	0	38	310
Sacramento	2	1	1	0	5	15	0	1	0	2	31
San Francisco	1	3	1	0	9	14	0	9	0	27	180

City reports for week ended Nov. 28, 1936—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				South Carolina:			
Fall River	1	0	0	Charleston	3	2	0
Connecticut:				Georgia:			
Bridgeport	1	0	0	Atlanta	0	0	2
New York:				Florida:			
Buffalo	2	0	1	Miami	0	0	1
New York	11	5	0	Kentucky:			
Pennsylvania:				Covington	0	1	0
Philadelphia	1	2	0	Lexington	1	1	0
Pittsburgh	3	2	0	Tennessee:			
Ohio:				Memphis	0	1	0
Cincinnati	2	0	0	Arkansas:			
Cleveland	0	0	1	Fort Smith	0	0	1
Toledo	1	0	0	Louisiana:			
Indiana:				New Orleans	1	0	4
Indianapolis	1	0	0	Oklahoma:			
Illinois:				Oklahoma City	2	0	0
Chicago	4	0	1	Tulsa	0	0	3
Michigan:				Texas:			
Detroit	1	1	1	Houston	1	0	0
Wisconsin:				Montana:			
Milwaukee	1	1	0	Missoula	1	0	0
Missouri:				Idaho:			
Kansas City	5	0	1	Boise	1	0	0
St. Louis	2	0	0	Colorado:			
Kansas:				Colorado Springs	1	0	0
Wichita	1	1	0	Washington:			
Maryland:				Spokane	1	0	1
Baltimore	2	1	0	Oregon:			
Virginia:				Portland	0	0	1
Norfolk	0	1	0	California:			
West Virginia:				Los Angeles	1	0	2
Wheeling	1	0	0	Sacramento	1	0	0
North Carolina:				San Francisco	1	0	1
Wilmington	1	0	0				

Encephalitis, epidemic or lethargic: Milwaukee, 2 cases.
Pellagra.—Cases: Boston, 1; Wilmington, N. C., 2; Charleston, S. C., 2; Savannah, 1; Los Angeles, 1; San Francisco, 1.
Smallpox.—Deaths: Fort Worth, 1.
Typhus fever.—Cases: New York, 1; Charleston, S. C., 1; Atlanta, 1; Savannah 1; Montgomery, 1.

FOREIGN AND INSULAR

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Nov. 27, 1936, pp. 1659–1673. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Dec. 25, 1936, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India—Province of Orissa.—During the week ended November 28, 1936, 155 cases of cholera with 81 deaths were reported in the Province of Orissa, India.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—A rat found December 7, 1936, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague infected.

Typhus Fever

Peru.—Typhus fever has been reported in Peru by departments, as follows: During the month of August, 1936, Arequipa, 1 case; Cuzco, 33 cases; Huancavelica, 4 cases; Huanuco, 5 cases; Libertad, 4 cases; Puno, 10 cases. During the month of September 1936, Ancash, 1 case; Arequipa, 1 case; Cuzco, 29 cases; Huanuco, 1 case; Ica, 8 cases; Junin, 2 cases; Libertad, 6 cases.

Yellow Fever

Colombia—Correction.—The report of one death from yellow fever at Puerto Wilches, Colombia, as published on page 1427 of the PUBLIC HEALTH REPORTS for October 9, 1936, is an error. A later report states that this case should have been reported as occurring in Restrepo, Intendencia of Meta, Colombia.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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PUBLIC HEALTH REPORTS

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AN ORGANIZATION FOR PROMOTING MENTAL HOSPITAL SERVICES IN THE UNITED STATES AND CANADA

By WALTER L. TREADWAY, *Assistant Surgeon General, United States Public Health Service*

INTRODUCTION

Perhaps every age has felt that great historic change impends in the life and enterprise of the time. Some national emergencies of the past, which for the time being seem to blacken the skies and threaten a permanent eclipse of national genius, have been no more than the gray hours before a social sunrise The emergencies through which the world has been passing in recent years may have the ultimate effect of illuminating American social life and American civilization.

In the past we have taken great pride in our achievements as a people, but with these achievements have gone many secret things which we have too long delayed to scrutinize with candid, fearless eyes Readjustments have been necessary from time to time in any civilization, for evils creep in with the good, the debased and decadent affect the sound and vital, and spots of corrosion appear here and there that demand attention and removal.

Aside from the countries of the North American continent, there is perhaps no other place in the world where men and women generally and individually have exhibited in more striking form that sympathy and helpfulness for rectifying wrong, alleviating suffering, and setting the weak in the way of strength and hope. Despite this altruistic and democratic attitude of our people, it is not generally appreciated that mental illness constitutes one of the large and important medical, social, economic, and health problems of our civilization. Its solution rests in part upon a more equal distribution of measures and facilities that will provide adequate and early treatment and care for adverse mental situations.

A greater knowledge of the nature and causes of mental ill health is the foundation upon which the whole superstructure for the prevention of mental illness and the conservation of mental health must be built. It is hardly necessary, therefore, to justify the responsibility for mental health or mental hygiene in its broader aspects as being a special or particular challenge to the medical profession.

NEED FOR MEDICAL LEADERSHIP

The recognition, treatment, and care of mental illness require a knowledge of these diseases. Moreover, the present status of medical knowledge in this field makes possible an interpretation of the needs and requirements of these unfortunate people. That knowledge, however, does not always enter into the formulation and administration of public policies toward the mentally ill wards of communities or political jurisdictions. In those jurisdictions where the public policies for treating or ameliorating adverse mental situations are planned, directed, and administered by medically trained persons the facilities and measures for meeting the needs of this form of illness stand far ahead of those where domiciliary facilities alone represent the assumed total of a community's obligation and responsibility.

Future responsibilities in this field do not involve clinging to tradition and custom or to cultivating change merely for change's sake. Tradition and change are not alternatives but are two indispensable elements of any civilization and must be kept in their proper relationship. It is obvious that there has always been a lag between the swiftly changing circumstances of life and the slowly changing outlook of a people. It is right that there should be some lag for it is unsafe to chase down the street after every Pied Piper who has snared a new notion from the cloudland of theory. Most ideas surviving the stresses and storms of centuries are right—that is, the ideas that have survived with living vitality, not those that have merely stayed on as cadavers to poison the intellectual atmosphere.

Changing situations in the scope of modern medical knowledge make it possible for the medical profession of today to assume leadership in shaping and directing public policies that seek a more uniform distribution of adequate facilities for the early recognition and treatment or amelioration of mental illness. Concerted medical leadership is required for the solution of this problem, a leadership and mutual participation of all those national and local medical agencies whose interests and responsibilities are directly concerned with any or all of the many diversified phases of the problem.

PARTICIPATING AGENCIES

In an effort to coordinate the various national medical interests concerned, a committee has been organized, the membership [1] consisting of representatives of the American Psychiatric Association, the

[1] The members of the committee are as follows: Walter L. Treadway, M. D., chairman, Washington, D. C.; S. Spafford Ackerly, M. D., Louisville, Ky.; L. Casamajor, M. D., New York City; Ross McC. Chapman, M. D., Towson, Md.; Franklin G. Ebaugh, M. D., Denver, Colo., C. M. Hincks, M. D., Toronto, Ontario, Canada; J. Allen Jackson, M. D., Danville, Pa.; Bernard T. McGhie, M. D., Toronto, Ontario, Canada; Arthur P. Noyes, M. D., Howard, R. I.; Winfred Overholser, M. D., Boston, Mass.; Frederick W. Parsons, M. D., Albany, N. Y.; Arthur H. Ruggles, M. D., Providence, R. I.; William L. Russell, M. D., White Plains, N. Y.; H. Douglas Singer, M. D., Chicago, Ill.

American Neurological Association, the American Medical Association, the American Board of Psychiatry and Neurology, the National Committee for Mental Hygiene, the United States Public Health Service, the Canadian National Committee for Mental Hygiene, and the Canadian Medical Association. This committee met in New York City on June 29, 1936, to discuss plans and policies for a survey of mental hospital services in the United States. Its ultimate purpose is to bring about a more equal and uniform distribution of adequate measures and facilities for the early recognition and treatment or amelioration of adverse mental conditions and to insure a wider distribution of adequate teaching facilities in psychiatry and neurology. Dr. Samuel W. Hamilton was elected medical director of the committee, with Dr. Grover A. Kempf of the Public Health Service as associate medical director, the latter having been assigned by the Surgeon General to cooperate in the studies.

OBJECTIVES

The evolution of public facilities and measures for meeting the needs of the mentally ill in the United States has been characterized by piecemeal growth and development, which have taken place to a considerable extent without due regard to basic medical facts or medical guidance. In consequence, some community needs have been fulfilled while others have been neglected. Institutional facilities alone, while important, are insufficient to meet the needs of the mentally ill. Changing conditions in our social order have imposed broader obligations upon communities which involve more expert medical service and more satisfactory measures and facilities for fulfilling the needs of the mentally sick.

It has long been apparent that no legislature, in terms of appropriations, has kept pace with the needs of the mentally ill. In some jurisdictions, responsibilities for the care of these persons have been assumed to a greater degree than in others. In jurisdictions where these responsibilities have been recognized, there are often varying standards when two or more similar services are compared. The differences are due to a wide variety of factors, not the least of which is the personal equation of local professional leadership

RESPONSIBILITIES OF THE MEDICAL PROFESSION

The personal equation, however, is only one consideration, for it is known that many public mental hospitals are restricted in their ability to render adequate services because of the limited funds available. Public appropriations tend to reflect the communities' conception and understanding of the needs. An enlightened understanding of the functions of a public mental hospital would certainly

contribute eventually to more nearly adequate financial support. This can be accomplished best through concerted medical leadership. The creation of such an understanding is not only of concern to the committee and the specialized professional groups who are devoting their lives to the problems of mental illness, but it concerns the entire medical profession.

INTERESTS OF THE PARTICIPATING AGENCIES

American Psychiatric Association.—The membership of the organization now known as the American Psychiatric Association has always stood for progress in the solution of the problems of mental illness and has made tremendous contributions to this field. The annual addresses of the various presidents of the American Psychiatric Association have for almost a century touched upon the care of patients in public mental hospitals and the functions which these institutions should perform. No small part of the annual programs of this association has been devoted to these subjects.

The interest of the association was furthered in this direction by the publication "The Institutional Care of the Insane in the United States and Canada," by the late Dr. Henry M. Hurd, Dr. William F. Drury, Dr. Richard Dewey, and others. The membership of the association contributed toward the publication of this work, which was issued in four volumes by the Johns Hopkins Press in 1916.

At the 1924 meeting of the association, resolutions were adopted directing the committee on standards and policies to report the following year a schedule of the minimum standards which it was thought hospitals for mental diseases might be "reasonably expected to establish and maintain." The 19 points recommended by that committee under the able leadership of Dr. William L. Russell are familiar to the members of the association. At an annual meeting held in Washington, D. C., in 1935, a resolution was proposed by Dr. C. Charles Burlingame that the council of that association authorize its executive committee to proceed with the classification and grading of the public mental hospitals of the United States and Canada.

American Neurological Association.—Other agencies besides the American Psychiatric Association have been interested in this problem. The membership of the American Neurological Association has always stood for improved standards for the recognition, care, and treatment of neurological diseases. The neurological clinical material found in wards of public mental hospitals offers opportunity for study and investigation and should serve for training young men who are to engage in the specialties of psychiatry and neurology. There is a dearth of facilities in the United States for training in organic neurology.

It is apparent from a practical point of view that men who are to engage in the field of psychiatry must necessarily have some under-

standing of neurological diseases and that those who are to engage in the practice of neurology should have some knowledge of mental diseases. It is hoped by many that young men entering the fields of psychiatry and neurology may be trained in both specialties so that this somewhat artificial division may be dissolved. For this accomplishment more centers will have to be established for the training of organic neurologists.

The diversified clinical material in practically every public mental hospital of the country makes it desirable to develop such institutions with the objective of affording some training in organic neurology. In this way every State would have some facilities for teaching undergraduates and graduates in these two allied fields instead of the widely scattered centers which exist at the present time.

American Board of Psychiatry and Neurology.—Not only has the American Neurological Association been interested in these matters, but the newly created American Board of Psychiatry and Neurology was confronted with the necessity of being cognizant of the facilities available in connection with public mental hospitals for instruction in the two specialties involved.

National Committee for Mental Hygiene.—The National Committee for Mental Hygiene for almost three decades has been interested in bringing about improved standards in the public care of mental diseases. It had its beginning with this objective in mind. The recent development of the Division of Mental Hospital Services in the national committee makes possible the utilization of that machinery in connection with the proposed activities of the committee.

American Medical Association.—The American Medical Association has long been concerned with the adequacy of facilities for hospital interneships and residencies not only in the field of general medical education but in the specialist's field as well. In the past three decades its Council on Medical Education has revolutionized medical education in this country. Dr. William D. Cutter, executive officer of the council, officially attended the meeting of the committee on June 29, 1936, taking part in the discussion and explaining the aims and objectives of the council. His willingness to cooperate with the committee and the opportunity mutually to exchange viewpoints in this particular field, articulated as it must be with the broader aspects of medical education, was gratifying and helpful to the several members of the committee.

The American Medical Association, while not directly concerned with the administration of mental hospitals or in methods of diagnosis and treatment of mental cases, such features belonging in the field of the specialist, is, nevertheless, interested in the general problems of hospital administration and the general functions of hospitals. Through its Council on Medical Education and Hospitals it has long

been interested and concerned with medical education in its broader aspects, including both graduate and undergraduate instruction in psychiatry and neurology. In this connection, it is logical to assume that the American Medical Association is aware of the need that the medical profession as a whole should be informed of facts which heretofore were restricted mainly to the specialist.

The medical profession.—An analogy has been drawn between the present situation affecting psychiatry today and aseptic surgery of 30 or more years ago. Thus, aseptic surgery solved the problem of removing an offending appendix. Until the general medical practitioner learned to make the diagnosis before it was too late, the general public did not reap the benefits of this improved technique. Similarly, the general practitioner of today must be alert to recognize the earliest symptoms and contributing factors in mental disease, if the fruits of progress in psychiatry are to be made generally available. He must also know what constitutes adequate care of the mentally ill of the community. The medical profession generally, and specialists, in particular, cannot stand aloof from these obligations, for the standards and policies toward the mentally ill of a community or political jurisdiction reflect favorably or adversely upon professional standards generally. The entire medical profession, including public health agencies, must join hands in an endeavor to solve the problems of mental illness.

Public health agencies.—During the past half century public health measures have been applied intensively to the prevention of deaths from communicable diseases and to the lessening of mortality in infancy. With progress in the prevention of needless deaths, attention of public health workers is being awakened to the basic fact that the health of communities depends not only on the survival of the individual but also on the amount and character of sickness in a population. It is a fact that diseases most frequently resulting in death are not necessarily those causing the most illness and incapacity, and that death rates alone cannot be regarded as an accurate index of the health and vitality of the people. In the development of a modern health program it is not deaths and longevity alone that should serve as health criteria, but the incidence and records of sickness and disability must also be taken into account.

The significance of the need for broadening the scope and outlook of public health measures will be better appreciated when it is realized that the future and security of a nation depend a great deal on the health of its citizens. This cannot be left wholly to individual endeavor, since measures and policies must be adopted eventually for more closely integrating individual medical services with those concerned with the prevention of disease and ill health. The time has arrived when national and local health agencies must take cognizance of the need for greater uniformity and more equal distribution

of facilities and measures for the treatment or amelioration of mental ill health.

FINANCIAL SUPPORT

The ferment which leavened the revolution in medical education is responsible in part for financing the work of the Mental Hospital Survey Committee. The Rockefeller Foundation has made a grant in aid to the National Committee for Mental Hygiene in the amount of $16,000 annually in connection with the committee's activities. Dr. Alan Gregg, of the Foundation, attended the committee meeting and took part in the discussion. As always, his comments were constructive and helpful. The American Psychiatric Association has contributed an appropriation of $5,000 for this purpose, to be administered through the executive committee of the council of that organization. The Public Health Service is contributing in terms of personal services, traveling expenses, and other miscellaneous costs, which amounted to $13,027 for the fiscal year ending June 30, 1936.

ORGANIZATION AND AIMS

At a meeting held in New York City on June 29, 1936, the committee, after discussing the scope of its activities, decided that, for the time being at least, it would be necessary, largely because of financial reasons and the dearth of personnel, to confine the survey to public mental hospitals caring for the insane, the feeble-minded, and the epileptic, including privately endowed institutions of this character.

It was also the consensus of opinion of the committee that an approach to the survey of public mental hospitals should be through evaluating the adequacy of professional, subprofessional, and technical personnel engaged in the care and treatment of mental illness; a determination of the present status of the administrative organizations existing in various political jurisdictions, and the functions which such organizations actually perform; a determination of the availability and suitability of records necessary for evaluating and comparing the omissions and commissions of a given public policy; providing a comparative analysis of the economic problems involved in connection with making provisions for the care of the mentally ill; the evaluation of the adequacy or suitability of institutional structures and equipment; a study of the measures and facilities for the conduct of research; and consideration of the adequacy of facilities and policies concerning graduate and under-graduate instruction in neurology and psychiatry. It is apparent that the scope of these interests is so broad that any surveys undertaken must necessarily be made in piecemeal fashion, selecting certain phases for priority in approach. It is also obvious that a survey of such scope cannot be accomplished in a short time.

ADMINISTRATION

The committee also gave consideration to its internal organization necessary for effectively and economically fulfilling its purpose. The chairman was authorized to appoint an executive committee, having in mind the need for representation from each of the participating agencies and also the economic problems involved in connection with travel. The executive committee was subsequently appointed, consisting of Dr. Walter L. Treadway, chairman ex-officio, of Washington, D. C.; Dr. Winfred Overholser, of Boston, Mass.; Dr. Louis Casamajor, of New York City; and Dr. J. Allen Jackson, of Danville, Pa. The question of appointing subcommittees for special purposes was briefly discussed.

The medical director, Dr. Samuel W. Hamilton, and the associate medical director, Dr. Grover A. Kempf, have, since September 1, 1936, been conducting some brief experimental surveys for the purpose of determining a feasible and practicable method of approach.

The executive committee met in New York on the afternoon of September 27, 1936, for the purpose of considering certain administrative problems confronting the survey committee.

It was agreed that, for the present, the committee's interest should be concentrated on an orientation of the problem, first, by an analysis of the adequacy of the professional personnel engaged in the care and treatment of mental diseases; second, by an analysis for determining the present status of the administrative organizations existing in the several political jurisdictions and the functions which such organizations actually perform; and third, by an evaluation of the adequacy of institutional facilities and personnel for the intensive treatment of newly admitted persons to mental hospitals, with special reference to services rendered during the first year of residence.

It is anticipated that the survey of the personnel situation and the functions of the administrative organizations will be undertaken immediately and that studies of the measures for meeting the needs of early cases, which are much broader in scope, will be carried on synchronously with the above. Further consideration was given to the possibility of the appointment of a subcommittee to deal with questions of medical education in psychiatry and neurology, with special reference to the matter of approving institutions for interneships and residence, the subcommittee to cooperate with the Council on Medical Education and Hospitals of the American Medical Association. The chairman was instructed to appoint such a committee.

The executive committee was approached as to the feasibility or desirability of extending an invitation to the Canadian National Committee for Mental Hygiene and the Canadian Medical Association to become members of the participating agencies of the hospital survey.

The executive committee approved such a proposal with the understanding that any expenses involved in connection with special studies in the Dominion of Canada would be defrayed by the Canadian National Committee for Mental Hygiene.

The executive committee is of the opinion that it should lend moral support to improving the standards of care of mental diseases in the Dominion of Canada if such could be done without depleting the financial resources already available to the committee. As a result of these deliberations, the Canadian National Committee for Mental Hygiene and the Canadian Medical Association were invited to become participating bodies on the committee and were requested to appoint one or more representatives to serve on the committee.

A NEW PROBLEM IN SANITATION

The increasing popularity of the auto trailer, with the accompanying increase in the number of highway nomads, is causing many public health officials just concern. Quite aside from the medico-social problems created by the presence of increasing numbers of all-year automobile tourists, there have arisen a number of specific problems. Foremost among these may be mentioned the matter of safe milk and water and the sanitary disposal of human waste. Fortunately safe water is available along the highways in some States; and safe supplies are so well marked, supervised, and located that there is seldom an excuse for using a questionable supply.

With regard to safe milk the situation is not quite as favorable, though by no means generally dangerous. The wise trailer tourist will, of course, purchase pasteurized milk in a city or town through which he passes, keeping it cool, until it is consumed, in the small ice chest which is a feature of many of the new trailers. When pasteurized milk is not obtainable, he should protect himself by applying the knowledge that heating milk to a temperature of 142°–145° F. for 30 minutes will insure a margin of safety.

However, the chief source of concern is the unsafe or uncertain disposal of human excreta by trailer travelers, which may become a nuisance or a health menace.

As trailer accommodations have improved, provisions have been made for small toilet compartments in which excreta is deposited in cans containing chemical solutions reported to render the waste innocuous. This provision is, of course, highly commendable and constitutes a marked sanitary advance over earlier days when human waste was deposited rather promiscuously by the roadsides.

But a new complication now arises from the use of the can privies on trailers, for no extensive or satisfactory provisions have been made for the disposal of the wastes and the cleansing of the cans. Usually

it is not practicable to dispose of the wastes in tourist-camp privies, in the toilets of gasoline filling stations, or in the public comfort stations available in cities. To throw the excreta on the ground in the open country with the potential danger of contaminating a water supply or creating a nuisance is reprehensible.

It is felt that serious consideration must now be given to providing roadside facilities for the sanitary disposal of human waste from auto trailers. Possibly State or county departments of health could construct disposal systems near roads frequented by auto trailers. Here could be located a combined comfort station and place for the disposal of excreta. The location of such places could be made known by appropriate road signs. Not only would such facilities be greatly appreciated by the occupants of trailers but the opportunities for the creation of nuisances would be materially lessened and potential menaces to the public health would be definitely removed.

The matter is believed to be of sufficient importance to warrant the earnest attention of health officials, automobile associations, and trailer passengers themselves.

USE OF THE VISCEROTOME TO OBTAIN MATERIAL FOR DIAGNOSIS OF PLAGUE

For the benefit of those who have not used this comparatively new device, it may be said that the viscerotome is an instrument designed by Dr. E. R. Rickard, of the Rockefeller Foundation, while working in Pernambuco, Brazil, for the purpose of obtaining small pieces of liver for microscopic section and study in the case of persons dying of a disease suspected to be yellow fever.

The instrument consists of a holder or shield and a flexible cutting and grasping blade. Through a very small aperture in the skin the point of the instrument is inserted into the liver and by a very simple manipulation a small portion of the organ is snipped out and removed. Portions of the spleen or glands may be removed in the same way.

Recently, Dr. Henry Hanson, a representative of the Pan American Sanitary Bureau, working in the Republic of Ecuador, reported that the health authorities of that country are employing this instrument successfully in obtaining material for diagnosis in deaths from suspected bubonic plague.

An illustration of the viscerotome appeared in the *Pan American Sanitary Bulletin* (*Boletín de la Oficina Sanitaria Panamericana*), for April 1934, page 375.

COURT DECISION ON PUBLIC HEALTH

City held liable for improper sewage disposal.—(Oklahoma Supreme Court; *Oklahoma City* v. *Eylar*. 61 P. (2d) 649; decided October 13, 1936.) The plaintiff was the owner of some land adjacent to the river into which the defendant city emptied its sewage. On account of negligent operation of the sewer system, or by improper treatment of the sewage, there were created foul and noxious odors which diminished the right of the plaintiff and his family to enjoy the premises as their home. This was an action instituted by the plaintiff to recover damages. A judgment for $1,000 was rendered in favor of the plaintiff, and from that judgment the defendant appealed.

In sustaining the judgment in favor of the plaintiff the supreme court made two points of interest, which, as contained in the syllabus by the court, are as follows:

The manner of maintenance by a city of a sewer may constitute a nuisance, and, where it does so, immunity from damages does not ensue under the theory that the city is engaged in a governmental function.

The personal inconvenience, annoyance, and discomfort to the occupant of real estate caused by the maintenance by another of a temporary nuisance in the immediate vicinity of said real estate is a separate and distinct element of damage from that of the depreciation of the usable or rental value of the real estate occupied; the measure of such damages being reasonable compensation for the injury.

For similar cases see *Oklahoma City* v. *Myers* (1936) 61 P. (2d) 653; *Town of Sentinel* v. *Boggs* (1936) 61 P. (2d) 654; *Oklahoma City* v. *Dyer* (1936) 61 P. (2d) 660. In the last mentioned case the court stated the measure of damages in such cases to be "the depreciation of the rental value of the property caused by the nuisance."

DEATHS DURING WEEK ENDED DECEMBER 5, 1936

[From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec 5, 1936	Corresponding week 1935
Data from 86 large cities of the United States:		
Total deaths	8,742	8,731
Deaths per 1,000 population, annual basis	12.2	12.2
Deaths under 1 year of age	527	525
Deaths under 1 year of age per 1,000 estimated live births	48	48
Deaths per 1,000 population, annual basis, 49 weeks of year	12.0	11.3
Data from industrial insurance companies:		
Policies in force	68,816,785	67,820,109
Number of death claims	11,873	12,549
Death claims per 1,000 policies in force, annual rate	9.0	9.6
Death claims per 1,000 policies, 49 weeks of year, annual rate	9.7	9.5

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 12, 1936, and December 14, 1935

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 12, 1936, and Dec. 14, 1935

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935
New England States:								
Maine	1	2		2	37	179	1	1
New Hampshire		1			15	1	0	0
Vermont		1				118	0	0
Massachusetts	3	15			316	125	5	2
Rhode Island		1			12	79	0	0
Connecticut	2	5	2	5	93	134	0	0
Middle Atlantic States:								
New York	37	54	[1] 14	[1] 19	203	662	9	5
New Jersey	22	24	30	13	86	21	8	1
Pennsylvania	35	46			49	198	7	5
East North Central States:								
Ohio	24	67	25	78	20	120	11	5
Indiana	33	43	34	35	11	12	8	4
Illinois	33	76	45	35	15	29	2	10
Michigan	14	30		5	34	42	1	8
Wisconsin	6	2	25	79	17	68	1	1
West North Central States:								
Minnesota	6	5			41	47	0	0
Iowa	3	18	2	1	3	12	2	2
Missouri	15	51	55	95	1	5	1	4
North Dakota	2	5		10	1	2	0	0
South Dakota		4				5	0	0
Nebraska	2	9			1	17	0	2
Kansas	12	24	3		6	6	5	2
South Atlantic States:								
Delaware					21	50	1	0
Maryland [2]	15	15	10	9	111	43	5	4
District of Columbia	5	33			1	3	1	3
Virginia	33	44			32	15	2	2
West Virginia	25	37	77	52	16	13	11	2
North Carolina [3]	76	51	6	9	18	15	5	0
South Carolina [4]	14	9	410	235	30	6	1	2
Georgia [4]	36	20		113			4	0
Florida	7	9	6	4	6		1	0
East South Central States:								
Kentucky	29	36	29	24	10	14	8	3
Tennessee	23	81	93	72	4	1	2	3
Alabama [4]	36	26	189	88	2	10	1	3
Mississippi [2,4]	17	13					2	1
West South Central States:								
Arkansas	6	6	47	43	2	3	1	5
Louisiana	14	19	9	25	2	13	1	2
Oklahoma [3]	5	17	51	48	4	3	2	85
Texas [4]	78	111	556	202	61	16	1	11

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 12, 1936, and Dec. 14, 1935—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935
Mountain States:								
Montana	2	1	18	17	-------	15	0	0
Idaho	1	-------	11	2	133	23	1	0
Wyoming	-------	-------	-------	-------	-------	4	0	0
Colorado	8	8	-------	-------	6	11	0	1
New Mexico	1	6	3	-------	54	3	1	0
Arizona	7	3	46	56	70	3	0	0
Utah [2]	-------	-------	-------	-------	4	4	0	1
Pacific States:								
Washington	8	-------	4	8	17	259	0	1
Oregon	1	-------	44	17	8	408	2	2
California [3]	52	43	127	29	13	253	2	7
Total	749	1,021	1,971	1,425	1,586	3,079	106	135
50 weeks of year	27,490	36,393	153,510	115,554	281,071	716,637	7,203	5,378

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935
New England States:								
Maine	1	3	29	29	0	0	1	0
New Hampshire	0	0	11	16	0	0	1	1
Vermont	0	0	2	16	0	0	0	1
Massachusetts	0	6	158	217	0	0	2	3
Rhode Island	0	0	11	22	0	0	1	0
Connecticut	0	1	44	59	0	0	2	2
Middle Atlantic States:								
New York	0	8	453	623	8	1	9	19
New Jersey	0	3	84	163	0	0	2	2
Pennsylvania	1	4	364	555	0	0	27	27
East North Central States:								
Ohio	7	1	320	485	1	1	3	4
Indiana	0	1	152	190	3	1	3	7
Illinois	4	4	381	622	0	8	1	6
Michigan	2	6	370	320	2	0	11	10
Wisconsin	0	1	247	424	17	4	0	0
West North Central States:								
Minnesota	1	0	144	376	8	1	0	1
Iowa	1	1	94	180	11	1	1	1
Missouri	2	1	145	140	1	0	2	1
North Dakota	0	0	88	62	5	4	0	0
South Dakota	0	0	44	66	15	15	0	2
Nebraska	0	0	63	256	1	45	1	0
Kansas	5	0	214	186	13	2	9	5
South Atlantic States:								
Delaware	0	0	16	11	0	0	3	1
Maryland [2]	1	0	62	76	0	0	5	7
District of Columbia	0	0	10	19	0	0	1	6
Virginia	0	0	55	75	0	0	14	5
West Virginia	0	0	55	74	0	1	4	5
North Carolina [3]	0	4	65	68	0	0	9	6
South Carolina [4]	0	1	8	3	0	0	3	1
Georgia [4]	4	0	55	33	0	0	6	9
Florida	0	0	5	11	0	0	3	4
East South Central States:								
Kentucky	1	2	68	71	0	0	9	19
Tennessee	3	1	54	72	0	1	14	6
Alabama [4]	1	0	27	14	0	0	3	2
Mississippi [2,4]	2	0	11	17	0	0	1	7
West South Central States:								
Arkansas	4	0	5	12	0	0	5	5
Louisiana	1	0	8	23	0	1	4	13
Oklahoma [5]	3	0	23	25	0	1	7	9
Texas [4]	4	0	130	134	0	0	14	14

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 12, 1936, and Dec. 14, 1935—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935	Week ended Dec. 12, 1936	Week ended Dec. 14, 1935
Mountain States:								
Montana	0	0	68	143	18	22	3	0
Idaho	0	0	52	60	2	1	2	0
Wyoming	0	0	8	98	5	2	2	0
Colorado	2	1	66	94	4	0	0	1
New Mexico	3	1	15	28	0	1	13	5
Arizona	1	1	13	25	0	0	4	0
Utah [2]	0	0	18	108	0	0	0	0
Pacific States:								
Washington	0	3	57	69	9	23	1	1
Oregon	0	5	34	59	52	1	2	3
California [3]	13	7	252	337	0	3	8	16
Total	67	66	4,658	6,766	175	140	216	237
50 weeks of year	4,427	10,640	225,440	240,108	7,116	7,134	14,353	17,201

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Dec. 12, 1936, 2 cases, as follows: North Carolina, 1; California, 1.
[4] Typhus fever, week ended Dec. 12, 1936, 40 cases, as follows: South Carolina, 1; Georgia, 15; Alabama, 10; Mississippi, 1; Texas, 13.
[5] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1936										
Hawaii Territory	1	9	423		67		0	1	0	1
November 1936										
California	19	247	171	7	114	7	38	964	9	48
Colorado	11	32	1		16		15	139	9	2
Georgia	5	207	290	1,221	20	16	25	154	0	39
Maine	1	13	10		52		2	61	0	4
New Jersey	4	53	57	1	167		3	241	0	12
New Mexico	1	18	6		64		2	89	1	26
North Carolina	12	510	35		102	27	2	374	0	35
South Carolina		327	381	122	24	5	1	6	0	5
West Virginia	13	103	123		38		3	253	0	36

October 1936

Hawaii Territory:	Cases
Chicken pox	16
Conjunctivitis, epidemic	1
Dysentery (amoebic)	1
Hookworm disease	14
Impetigo contagiosa	22
Jaundice, acute infectious	16
Leprosy	7
Mumps	64
Tetanus	1
Trachoma	61
Typhus fever	11
Whooping cough	15

November 1936

	Cases
Actinomycosis:	
California	2
Georgia	1
Anthrax:	
Georgia	4
Chicken pox:	
California	1,308
Colorado	173
Georgia	32
Maine	210
New Jersey	844
New Mexico	64
North Carolina	182
South Carolina	10
West Virginia	128
Conjunctivitis:	
Georgia	14
New Mexico	1
Dengue:	
Georgia	14
Diarrhea:	
South Carolina	46
Dysentery:	
California (amoebic)	9
California (bacillary)	23
Georgia (amoebic)	9
Georgia (bacillary)	9
New Jersey (amoebic)	1
New Jersey (bacillary)	1
New Mexico (amoebic)	2
New Mexico (bacillary)	8

November 1936—Continued

	Cases
Dysentery—Continued.	
New Mexico (unspecified)	13
West Virginia	2
Encephalitis, epidemic or lethargic:	
California	2
New Jersey	3
Food poisoning:	
California	23
German measles:	
California	57
Maine	20
New Jersey	155
New Mexico	2
North Carolina	10
South Carolina	1
Granuloma, coccidioidal:	
California	3
Hookworm disease:	
Georgia	1,174
South Carolina	14
Impetigo contagiosa:	
Colorado	2
Lead poisoning:	
New Jersey	1
Milk sickness:	
New Mexico	1
Mumps:	
California	1,613
Colorado	16
Georgia	65
Maine	319
New Jersey	385
New Mexico	61
South Carolina	7
West Virginia	47
Ophthalmia neonatorum:	
California	2
New Jersey	10
North Carolina	1
South Carolina	1
Paratyphoid fever:	
California	•3
Colorado	1
North Carolina	3
West Virginia	2
Puerperal septicemia:	
New Mexico	1

November 1936—Continued

	Cases
Rabies in animals:	
California	83
Maine	4
New Jersey	2
New Mexico	2
South Carolina	31
Rocky Mountain spotted fever:	
North Carolina	2
Scabies:	
Colorado	8
Septic sore throat:	
California	7
Georgia	27
New Mexico	2
North Carolina	15
Tetanus:	
California	3
South Carolina	1
Trachoma:	
California	12
Trichinosis:	
California	2
Tularaemia:	
Georgia	4
South Carolina	1
Typhus fever:	
Georgia	68
North Carolina	1
South Carolina	2
Undulant fever:	
California	12
Georgia	2
New Jersey	2
North Carolina	3
South Carolina	1
Vincent's infection:	
Maine	11
Whooping cough:	
California	929
Colorado	155
Georgia	32
Maine	163
New Jersey	599
New Mexico	27
North Carolina	169
South Carolina	9
West Virginia	72

CASES OF VENEREAL DISEASES REPORTED FOR OCTOBER 1936

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,454	5.13	355	1.23
Arizona [1]				
Arkansas [2]	170	.85	73	.37
California	1,239	2.29	1,339	2.37
Colorado	21	.20	35	.33
Connecticut	222	1.29	151	.88
Delaware [1]	144	5.63	57	2.23
District of Columbia [1]				
Florida	315	1.95	81	.50
Georgia	1,311	3.92	931	2.78
Idaho	54	1.13	57	1.19
Illinois	1,554	1.99	1,114	1.43
Indiana	163	.48	134	.39
Iowa [2]	120	.47	148	.58
Kansas	63	.34	66	.36
Kentucky	284	1.00	321	1.13
Louisiana	242	1.14	159	.75
Maine [2]	24	.28	62	.73
Maryland	853	5.29	290	1.74
Massachusetts	466	1.07	567	1.30
Michigan	434	.93	589	1.26

notes at end of table.

Reports from States—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Minnesota	345	1.31	346	1.32
Mississippi	1,668	8.51	2,119	10.81
Missouri	752	1.92	342	.87
Montana [2]	44	.83	76	1.43
Nebraska	38	.28	106	.78
Nevada [3]				
New Hampshire	17	.34	16	.32
New Jersey	708	1.65	358	.83
New Mexico	64	1.59	49	1.22
New York	7,611	5.91	2,306	1.79
North Carolina	1,370	4.01	523	1.53
North Dakota	14	.20	100	1.43
Ohio [1]	1,021	1.52	431	.65
Oklahoma [2]	197	.79	174	.69
Oregon	36	.36	151	1.50
Pennsylvania [4]	332	.33	173	.17
Rhode Island	93	1.37	73	1.07
South Carolina [2]	341	1.69	255	2.26
South Dakota	13	.19	22	.33
Tennessee [4]	669	2.30	354	1.22
Texas	684	1.13	321	.53
Utah [3]				
Vermont [1]				
Virginia	515	1.95	307	1.16
Washington	144	.83	260	1.59
West Virginia	250	1.38	118	.65
Wisconsin [5]	26	.09	155	.53
Wyoming [3]				
Total	26,165	2.09	15,835	1.27

Reports from cities of 200,000 population or over

Akron, Ohio	25	0.92	9	0.33
Atlanta, Ga.[6]				
Baltimore, Md.	453	5.49	150	1.82
Birmingham, Ala.	155	5.49	88	3.12
Boston, Mass.	181	2.29	203	2.57
Buffalo, N. Y.	278	4.70	112	1.89
Chicago, Ill.	927	2.60	763	2.14
Cincinnati, Ohio [6]				
Cleveland, Ohio	194	2.09	118	1.27
Columbus, Ohio	73	2.39	63	2.06
Dallas, Tex.[6]				
Dayton, Ohio [6]				
Denver, Colo.	34	1.15	35	1.18
Detroit, Mich.	219	1.27	298	1.72
Houston, Tex.[7]	207	6.18	52	1.55
Indianapolis, Ind.	30	.80	37	.98
Jersey City, N. J.[6]				
Kansas City, Mo.	62	1.47	6	.14
Los Angeles, Calif.[6]				
Louisville, Ky.	127	3.92	26	.80
Memphis, Tenn.	230	8.61	73	2.73
Milwaukee, Wis.[6]				
Minneapolis, Minn.	99	2.03	94	1.93
Newark, N. J.	247	5.33	122	2.63
New Orleans, La.[6]				
New York, N. Y.	6,253	8.56	1,443	1.98
Oakland, Calif.	33	1.09	47	1.55
Omaha, Nebr.	8	.36	14	.64
Philadelphia, Pa.	215	1.08	42	.21
Pittsburgh, Pa.	69	1.01	38	.56
Portland, Oreg.[6]				
Providence, R. I.	48	1.85	43	1.66
Rochester, N. Y.	50	1.48	59	1.75
St. Louis, Mo.	149	1.78	74	.89
St. Paul, Minn.	42	1.49	54	1.91
San Antonio, Tex.[6]				
San Francisco, Calif.	150	2.24	148	2.21
Seattle, Wash.	93	2.45	143	3.77
Syracuse, N. Y.	67	3.07	47	2.16
Toledo, Ohio	38	1.25	28	.92
Washington, D. C.[6]				

[1] Has been reporting regularly but no report received for current month. [2] Incomplete. [3] Not reporting.
[4] Includes only those cases that enter the clinics conducted by the State department of health.
[5] Only cases of syphilis in the infectious stage are reported.
[6] No report for current month.
[7] Reported by Jefferson Davis Hospital; physicians are not required to report venereal diseases.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 5, 1936

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland	0	------	0	0	6	0	0	1	0	3	33
New Hampshire:											
Concord	0	------	1	0	0	0	0	0	0	0	12
Nashua	0	------	------	0	------	0	0	------	0	0	------
Vermont:											
Barre	0	------	0	0	2	0	0	1	0	2	8
Burlington	0	------	0	0	0	1	0	0	0	0	7
Rutland	0	------	0	0	2	1	0	0	0	0	7
Massachusetts:											
Boston	0	------	1	8	20	38	0	6	0	180	259
Fall River	1	------	0	1	0	1	0	0	0	0	28
Springfield	0	------	0	1	8	1	0	0	0	8	31
Worcester	0	------	0	31	8	6	0	2	0	40	53
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	21
Providence	1	------	0	9	7	20	0	5	2	18	80
Connecticut											
Bridgeport	0	------	1	8	3	0	0	0	0	2	40
Hartford	0	------	0	0	2	8	0	1	0	6	53
New Haven	0	------	2	0	1	1	0	1	0	6	70
New York:											
Buffalo	0	------	0	25	11	31	0	5	1	12	136
New York	27	7	3	39	95	99	0	89	5	94	1,455
Rochester	0	------	0	0	6	2	0	0	0	8	66
Syracuse	1	------	0	0	5	7	0	1	1	14	46
New Jersey:											
Camden	1	3	2	0	2	4	0	2	0	8	39
Newark	0	2	1	7	7	8	0	9	0	24	90
Trenton	0	------	0	0	3	2	0	3	0	5	44
Pennsylvania:											
Philadelphia	9	5	4	6	41	63	0	32	1	100	518
Pittsburgh	3	6	5	1	23	28	0	7	1	16	204
Reading	0	------	0	0	5	1	0	2	0	31	30
Scranton	0	------	------	0	------	2	0	------	0	0	------
Ohio:											
Cincinnati	3	------	3	1	18	5	0	8	0	2	174
Cleveland	2	10	1	2	15	44	0	11	1	31	199
Columbus	4	3	3	1	6	3	0	4	0	6	96
Toledo	1	------	0	3	5	3	0	3	0	19	64
Indiana:											
Anderson	0	------	0	2	0	6	0	0	0	0	8
Fort Wayne	0	------	0	0	0	8	0	0	0	1	31
Indianapolis	0	------	0	2	7	16	0	4	0	11	122
Muncie	1	------	0	0	0	2	0	1	0	0	6
South Bend	0	------	0	0	0	1	0	0	0	2	14
Terre Haute	0	------	0	0	0	4	0	0	0	0	20
Illinois:											
Alton	0	------	0	0	0	6	0	1	0	0	11
Chicago	6	9	0	13	45	152	0	28	0	69	667
Elgin	1	------	0	0	0	0	0	0	0	18	10
Moline	0	------	0	0	1	1	0	1	0	4	7
Springfield	0	1	0	0	4	3	0	0	1	10	19
Michigan:											
Detroit	9	------	1	9	28	119	0	18	1	99	280
Flint	1	------	0	1	4	20	0	0	0	14	19
Grand Rapids	0	------	0	3	0	16	0	0	0	19	41
Wisconsin:											
Kenosha	0	------	0	0	1	4	0	0	0	0	------
Madison	0	------	0	2	0	7	0	0	0	1	9
Milwaukee	0	------	0	1	5	28	1	7	1	43	81
Racine	0	------	0	1	0	16	0	0	0	1	6
Superior	0	------	0	0	0	2	0	0	0	0	4
Minnesota:											
Duluth	0	------	0	0	0	18	0	1	0	9	27
Minneapolis	4	------	1	4	3	18	0	0	0	15	112
St. Paul	0	------	0	2	11	18	0	2	0	18	56
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	0	------
Davenport	0	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	------	0	------	9	0	------	0	0	33
Sioux City	0	------	------	0	------	7	2	------	0	2	------
Waterloo	1	------	------	0	------	5	0	------	0	3	------

City reports for week ended Dec. 5, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Missouri:											
Kansas City	2		0	2	10	32	0	6	0	17	97
St. Joseph	3		0	0	4	6	0	1	0	0	20
St. Louis	11	2	0	1	13	34	0	6	0	20	212
North Dakota:											
Fargo	2		0	0	1	2	1	0	0	0	10
Grand Forks	0		0	0		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	5
South Dakota.											
Aberdeen	0			0		1	0		0	0	
Sioux Falls	0		0	0	0	1	0	0	0	0	8
Nebraska:											
Omaha	1		0	0	10	10	0	0	0	5	56
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	0	1
Topeka	0		0	2	0	5	0	0	0	4	12
Wichita	1		0	0	10	5	0	0	0	1	44
Delaware:											
Wilmington	0		0	6	6	1	0	0	0	0	23
Maryland:											
Baltimore	7	11	1	69	19	19	0	15	0	84	241
Cumberland	0		0	0	2	0	0	0	1	0	14
Frederick	0		0	0	0	0	0	0	0	0	2
District of Columbia.											
Washington	13	2	1	7	18	20	0	11	0	24	183
Virginia:											
Lynchburg	1		0	0	2	0	0	0	0	5	13
Norfolk	0		0	0	2	2	0	1	0	0	26
Richmond	0		2	2	3	8	0	3	0	0	65
Roanoke	0		0	0	2	2	0	0	0	2	29
West Virginia:											
Charleston	1		0	0	5	0	0	0	1	0	31
Huntington	2			0		1	0	0		0	
Wheeling	0		0	0	4	0	0	0	0	1	15
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	0	
Raleigh	0		0	0	0	1	0	0	0	0	19
Wilmington	0		0	0	2	2	0	1	0	0	12
Winston-Salem	2		0	1	6	0	0	0	0	0	15
South Carolina:											
Charleston	0	48	0	0	3	2	0	2	2	0	35
Columbia	0		0	0	6	0	0	0	0	0	14
Florence	0		0	0	0	0	0	0	0	0	0
Greenville	2		0	0	2	0	0	1	0	0	35
Georgia:											
Atlanta	8	20	2	0	12	9	0	3	0	0	
Brunswick	0		0	0	1	0	0	0	0	0	6
Savannah	0	10	0	0	4	4	0	2	1	1	32
Florida:											
Tampa	0	1	1	0	1	2	0	1	0	7	24
Kentucky:											
Ashland	0			0	2	1	0		0	0	18
Covington	0		0	0	5	2	0	1	0	0	15
Lexington	0	3	0	2	2	0	0	2	0	0	20
Louisville	0	3	0	1	11	15	0	3	0	15	61
Tennessee:											
Knoxville	1		0	0	5	2	0	1	0	0	39
Memphis	2		1	0	5	12	0	3	1	7	77
Nashville	1		0	0	6	1	0	1	1	0	63
Alabama:											
Birmingham	4		0	0	9	1	0	4	0	0	67
Mobile	1		0	2	1	4	0	0	0	0	24
Montgomery	1	1		0		4	0		0	0	
Arkansas:											
Fort Smith	0			0		2	0		0	1	1
Little Rock	0		0	0	4	1	0	4	0	0	9
Louisiana:											
Lake Charles	0		0	0	2	0	0	0	0	0	10
New Orleans	16		5	0	17	0	0	11	1	0	196
Shreveport	0		0	0	8	0	0	4	0	0	41
Oklahoma:											
Oklahoma City	2		0	0	8	2	0	1	0	0	41
Texas:											
Dallas	7	2	2	1	11	20	0	3	0	4	77
Fort Worth	1		1	28	10	26	0	3	0	0	56
Galveston	2		0	0	8	0	0	0	1	0	23
Houston	9		0	0	16	3	0	5	1	0	104
San Antonio	3		3	0	9	2	0	10	0	0	84

City reports for week ended Dec. 5, 1936—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Montana:											
Billings	1	------	0	1	0	1	0	0	0	0	5
Great Falls	0	------	0	0	1	3	1	0	0	2	4
Helena	0	------	0	2	2	3	0	0	0	0	5
Missoula	0	------	0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0	------	1	0	5	4	0	0	1	0	12
Colorado:											
Colorado Springs	0	------	0	1	1	2	0	2	0	0	9
Denver	6	------	1	2	7	14	0	8	0	46	91
Pueblo	3	------	1	0	1	4	0	0	0	0	13
New Mexico:											
Albuquerque	0	1	0	0	1	0	0	3	1	0	11
Utah:											
Salt Lake City	0	------	1	0	5	10	0	0	0	0	34
Nevada:											
Reno	------	------	------	------	------	------	------	------	------	------	------
Washington:											
Seattle	1	------	1	2	11	7	0	5	1	0	115
Spokane	1	0	0	0	4	6	0	1	0	0	33
Tacoma	0	------	0	0	5	7	0	0	0	0	40
Oregon:											
Portland	1	------	0	1	6	13	0	3	0	4	74
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	13	15	1	8	26	27	1	19	0	45	300
Sacramento	2	------	0	0	6	6	0	2	0	2	38
San Francisco	2	------	0	2	9	18	0	5	1	19	163

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Maine:				Virginia:			
Portland	0	0	1	Norfolk	1	0	0
Massachusetts:				West Virginia:			
Boston	1	0	0	Charleston	1	1	0
Fall River	0	1	0	Wheeling	1	0	0
Rhode Island:				South Carolina:			
Providence	1	0	0	Charleston	1	0	0
New York:				Georgia:			
New York	4	1	1	Atlanta	1	1	1
New Jersey:				Kentucky:			
Trenton	1	0	0	Ashland	0	1	0
Pennsylvania:				Covington	0	1	0
Philadelphia	1	0	0	Tennessee:			
Ohio:				Knoxville	0	0	1
Cincinnati	2	2	0	Memphis	2	0	0
Cleveland	3	1	0	Alabama:			
Columbus	0	0	1	Birmingham	1	0	0
Toledo	0	0	1	Arkansas:			
Indiana:				Fort Smith	0	0	2
Fort Wayne	1	0	0	Louisiana:			
Indianapolis	2	3	0	New Orleans	0	0	2
Illinois:				Shreveport	0	2	0
Chicago	1	0	2	Oklahoma:			
Michigan:				Oklahoma City	1	0	1
Detroit	1	0	1	Texas:			
Wisconsin:				Galveston	0	0	1
Racine	1	0	0	Houston	0	1	0
Iowa:				San Antonio	0	1	0
Des Moines	1	0	0	Montana:			
Missouri:				Missoula	1	1	0
Kansas City	2	2	0	Idaho:			
Nebraska:				Boise	1	1	0
Omaha	1	0	0	Colorado:			
Kansas:				Colorado Springs	0	1	0
Wichita	1	1	0	Utah:			
Maryland:				Salt Lake City	1	1	0
Baltimore	1	0	0	California:			
District of Columbia:				Los Angeles	1	0	1
Washington	2	1	0				

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Newark, 1; Pittsburgh, 1; Nashville, 1.
Rabies in man.—Deaths: Philadelphia, 1.
Typhus fever.—Cases. Charleston, S. C., 2; Atlanta, 1; Tampa, 1; Montgomery, 2; Forth Worth, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended November 28, 1936.—During the 2 weeks ended November 28, 1936, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	1	3		1			6
Chicken pox		13	1	682	825	183	245	45	189	2, 183
Diphtheria	1	9		64	19	6	2		2	103
Dysentery				1	2					3
Erysipelas		1		9	6	5	3	2	10	36
Influenza		17			15	6			10	48
Lethargic encephalitis						1				1
Measles		3	11	436	373	72	740	224	774	2, 633
Mumps		1	47		204	8	28	55	142	575
Paratyphoid fever					1					1
Pneumonia	7	4			47		6		12	76
Poliomyelitis				5	8	15	14		2	44
Scarlet fever		43	27	202	404	156	50	182	63	1, 127
Smallpox								3		3
Trachoma							1			1
Tuberculosis	5	10	13	106	77	39	2	3	25	280
Typhoid fever		2	4	21	9	3	2	2	7	50
Undulant fever				3	5				1	9
Whooping cough		76	5	226	342	48	50	18	93	858

GERMANY

Vital statistics—Second quarter 1936.—Following are vital statistics for Germany for the second quarter of 1936:

Number of marriages	171, 304	Total deaths	196, 103
Number of live births	330, 274	Deaths per 1,000 population	11. 6
Number of live births per 1,000 population	19. 6	Deaths under 1 year of age	23, 060
Number of stillbirths	8, 327	Deaths under 1 year of age per 100 live births	7. 1

JAMAICA

Communicable diseases—4 weeks ended November 28, 1936.—During the 4 weeks ended November 28, 1936, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy	1	1
Chicken pox	1	16	Poliomyelitis		1
Diphtheria	1	5	Scarlet fever		1
Dysentery	8	14	Tuberculosis	33	105
Erysipelas		1	Typhoid fever	14	51

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	July 26–Aug. 29, 1936	Week ended— September 1936				October 1936					November 1936			
						5	12	19	26	3	10	17	24	31	7	14	21	28
Afghanistan	C										P							
Ceylon: Batticaloa	C										3							
India	C	21,278	15,291	17,917	25,973	5,675	5,296	4,729	4,183	4,172	4,358	3,569	3,761					
	D	10,634	7,672	8,500	12,681	2,810	2,555	2,367	2,053	1,965	1,998	1,650	1,755					
Assam	C	569	262	151	293	87	76	82	44	89	59	109	62	49	174	176	187	173
	D	292	152	75	180	46	47	30	35	38	38	59	29	20	88	82	79	69
Bassein	C	9	12	1	1													
Bombay Presidency	C	365	592	1,923	3,597	693	841	751	685	752	897	913	809	910	465			
	D	123	224	795	1,500	345	395	325	313	327	357	429	356	106	254			
Bombay	C		[1] 1	[1] 1			[1] 1				[2] 1							
Calcutta	C	1,012	580	154	103	14	16	13	11	13	11	10	9	30	14	13	19	15
Central Provinces and Berar	C	715	971	1,349	5,730	1,584		1,683	1,096	1,174	1,101	918	677	369	333	228	182	179
Chittagong	C	6	13	5	3	1	4		1			1	1			1		15
Madras Presidency	C	1,556	2,074	3,654	5,478	1,341	1,111	1,145	1,010	1,062	1,007	967	1,413					
	D	787	902	1,621	2,587	678	560	604	494	536	510	487	713					
Madras	C	2		6		4	2	1	1	1	8	3	9		6	6	17	28
	D			1	1			1			1	2	3		1	1	5	5
Moulmein	C	3	1															
Negapatam	C		13	15	24	3	1	4	1									
	D		9	7	10	1	1	1	2									
Northwest Frontier Province	C															2	5	77
Orissa Province	C																	155
Punjab	C	61	231	418	652	91	47	18	13	10	1		7				7	
Rangoon	C		2	3	3						1		1	2	1	1	1	1
Sind State	C				20	19	19											
Tuticorin	C			29												5	4	3
India (French):																		
Chandernagor Territory	C	2	7	8														
Karikal Province	C		8	117	98			25		45		24						
Pondichery Province	C	16	4	1	1			4										

[1] Suspected.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

C indicates cases; D, deaths; P, present]

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	July 26–Aug. 29, 1936	Week ended—												
						September 1936				October 1936					November 1936			
						5	12	19	26	3	10	17	24	31	7	14	21	28
Indochina (see also table below):																		
Bentre	C	1																
Pnom-Penh	C	1																
Siam:																		
Bangkok	C	52	36	22	1													
Provinces	C	288	34	66	117	20	7	16	14	8		6	3	1				
On vessels:																		
S. S. *Karagola* at Penang from Calcutta	C	1																
S. S. *Ekma* at Rangoon from Calcutta	C		1															
S. S. *Chakdina* at Calcutta from Chittagong	C			1														

Place		June 1936			July 1936			August 1936			September 1936			October 1-10, 1936
		1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–31	
Indochina (French) (see also table above):														
Cambodia [3]	C	1		1		2					2	2		
	D	1		1		2					2	1		
Cochinchina [3]	C		4	1	3	3	1				1			1
	D		4		3	3	1				1			1

[3] Reports incomplete.

PLAGUE[1]

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	July 26–Aug. 29, 1936	Week ended September 1936: 5	12	19	26	October 1936: 3	10	17	24	31	November 1936: 7	14	21	28
Algeria:																		
Oran Department	C				[2] 1	[2] 1		[2] 1										
Philippeville	C				[2] 1													
Argentina. (See table below.)																		
Azores. (See table below.)																		
Belgian Congo	C	1											[2] 2					
Brazil (see also table below):																		
Santos	C				4													
	D				1													
Sao Paulo.[3]																		
British East Africa:																		
Kenya	C	42	39	13	25	7	1	4	2	5	3	4	3	1	4	3		
Tanganyika	C	3																
Uganda	C	153	76	96	97	18	17	33	19	15	21	17	11	17	18			
	D	148	73	93	91	17	17	26	18	15	21	17	11	15	15			
Ceylon:																		
Colombo	C	3	3	3	1				1				1	2		2	2	
	D	3	3	3					1					1		2	1	
Plague-infected rats		8	2	2	1	1				2		1	3	1		5		
Hatton	C	3																
Maskiliya	C			1														
Southern Province	C				1													
China: Manchuria.[4]																		
Dutch East Indies: West Java	C	553	363	318	410	89												
	D	550	362	317	408	89												
Ecuador:																		
Alausi	C						1											
Babahoyo	C																5	
Plague-infected rats																	6	
Bajada del Morro	C											[5] 3				4		
Guayaquil	C				4	1			1				2	3	1	6	9	5
	D				1	1		1	1				1		2	5	2	5
Plague-infected rats			3	5	4	1	4	1		1		1	1	1	2	1	4	

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] A report dated July 29, 1936, states that 23 cases of pneumonic plague with 18 deaths were reported in Sao Paulo, Brazil.
[4] A report dated Aug. 20, 1936, states that 5 cases of plague were reported at Kirin Province, Manchuria, China.
[5] For 3 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	July 26–Aug. 29, 1936	Week ended												
						September 1936				October 1936					November 1936			
						5	12	19	26	3	10	17	24	31	7	14	21	28
Egypt:																		
Alexandria: Plague-infected rats		P	P	P	P	P		P		P		P		P		P		
Asyut Province	C	2	2				3		1					[4]3	1			
Beheira Province	C									1								
Girga Province	C	1												1		1		
Minya Province	C	1																
Suez	C		1															
France: Marseille [7]	C				1	1	1											
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua district:[8]																		
Hamakua Mill sector											1			1				
Paauhau sector [8]		2		3	6		7	10	5	6	1		3	2	1			2
Maui Island—Wailuku District—Keahua region													1					
India	C	626	139	294	900	298	259	229	386	486	469	326	438					
	D	406	92	186	531	143	106	82	99	141	151	115	114					
Bassein	C	5	2	9	5													1
Plague-infected rats					1		1						1					
Bombay Presidency	C	11	4	3	10	4	14	29	25	17	12	36	11	33	11			
	D	6	2	2	6	2	6	17	20	17	6	15	11	17	5			
Bombay	C		1															
Calcutta	C			[2]1														
Central Provinces and Berar	C	52		9	147	104	139	29	256	359	324	120	297	345	317	167	368	524
Madras Presidency	C	6		41	154	32	21	10		7	7	11	7	10	6			
	D	2		24	86	26	19	10		7	2	7	1	3	1			
Punjab	C	72																
	D	47																
Rangoon	C	5	2	2	3							1						
Plague-infected rats		1		1	4			1	2									
Indochina (see also table below):																		
Longxuyen	C		1															
Pnom-Penh	C	1			4													
Tanghai	C	4																
Iraq: Baghdad Province	C													1				
Madagascar. (See table below.)																		
Malta	C	1	3		4			1	2	[2]2			1		1	3	1	1
Peru. (See table below.)			1		1													

Senegal. (See table below.)																	
South-West Africa. (See table below.)																	
Tunisia: Tunis C				2					2	2	1				1		
Plague-infected rats		1	1	2													
Union of South Africa (see also table below) C	6	32	[6] 1	4		6						3		[9] 3			
United States:																	
California:																	
Eldorado County — Plague-infected chipmunk										1							
Lassen County — Plague-infected squirrels		5	1														
Modoc County [10] — Plague-infected squirrels		13	4	10													
Monterey County [10] C		1															
Placer County [10] C			1														
San Bernardino County.[10]																	
Santa Cruz County [10]—Plague-infected squirrels		50	11														
Ventura County — Plague-infected squirrels		P															
Idaho: Bonneville County—Plague-infected squirrels		7															
Montana: Beaverhead County.[11]																	
Nevada: Elko County—Plague-infected squirrels	P																
Utah:																	
Beaver County C			1														
Plague-infected marmots				2													
Plague-infected squirrels			1														
Garfield County [12]—Plague-infected prairie dogs				2													
Sevier County.[12]																	
On vessels:																	
S. S. *Ipanema* at Marseille from Bone and Philippeville C				1													
S. S. *Delambre* at Liverpool from Montevideo, Buenos Aires, Rosario, Santos, and Las Palmas—Plague-infected rats					2												

[5] Suspected.

[6] Includes 1 case of pneumonic plague.

[7] A report dated Sept. 3, 1936, states that 2 plague-infected rats were reported in Marseille, France.

[8] Plague-infected rats have been reported in Hawaii Territory, Hawaii Island, Hamakua District, as follows: No location, week ended Aug. 8, 2 plague-infected rats; Paauhau sector, week ended Dec. 5, 1 plague-infected rat, and week ended Dec. 12, 3 plague-infected rats.

[9] For 2 weeks.

[10] Plague-infected fleas have been reported in California as follows: Week ended June 27, 1936, 3 lots in Modoc County, and 7 lots in Santa Cruz County; Aug. 18–21, 104 plague-infected fleas collected from ground squirrels in San Bernardino County, and according to information dated Nov. 10, 31 fleas taken from 24 Fisher squirrels shot in Holcomb Valley, also in San Bernardino County have been proved positive for plague. A report dated Oct. 13, 1936, states that fleas taken from ground squirrels in Monterey County and from chipmunks and ground squirrels in Placer County have been proved plague infected.

[11] During the week ended July 25, 1936, 153 fleas and 26 lice taken from 7 marmots (ground hogs) shot at the head of Small Horn Canyon, Beaverhead County, Mont., were reported plague infected.

[12] Plague-infected fleas in Utah have also been reported as follows: Aug. 24, 45 fleas taken from 23 prairie dogs in Garfield County, and July 28, 1936, 315 fleas taken from 11 ground squirrels in Clear Creek Canyon, Sevier County.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 1936	June 1936	July 1936	August 1936	September 1936	October 1936
Argentina:							
Buenos Aires—							
Plague-infected rats							4
Catamarca Province	C						1
Salta Province	C			4			
Santiago del Estero Province	C					[13] 2	
Tucuman Province	C			1		[13] 6	
Azores	C	2					
Brazil (see also table above):							
Bahia State	C				[14] 46		
Ceara State	C				[14] 106		
Pernambuco State	C				[14] 45		
Piauhy State	C				[14] 4		
Indochina (see also table above):							
Cambodia	C	1		4	8		
Cochinchina	C	1	1	6	1		
Madagascar (central region)	C	48	38	26	83	104	
	D	47	36	26	81	95	
Peru	C	5	2	4	6	8	
Lambayeque Department	C					3	
Libertad Department	C	4	1	3	1	1	
Lima Department	C	1		1	2	2	
Callao	C		1				
	D		1				
Plague-infected rats					P	P	
Piura Department	C				3	2	
Senegal:							
Dakar [15]	C		2	1			
	D		2	1			
Thies [15]	C	2	1				
Tivaouane [15]	C	5	4	8	4		
South-West Africa: Ovamboland	C	23					
Union of South Africa (see also table above)	C					21	

SMALLPOX

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	July 26–Aug 29, 1936	Week ended— September 1936: 5	12	19	26	October 1936: 3	10	17	24	31	November 1936: 7	14	21	28
Algeria:																		
Constantine Department	C		2	1														
Oran Department	C		6	2														
Philippeville	C				1													
Angola. (See table below.)																		
Argentina. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		

Brazil:																		
Bahia	C			2	43	21	23	31	24	30	20							
Porto Alegre (alsastrim)	D				2				1			1	2					
Recife (alastrim)	C													3	1			
British East Africa: Tanganyika	C	73	7	106	94		73		1	100	15	9		[1] 329				
British Somaliland	C	10	19		2													
Canada:																		
Alberta	C	2	[2] 2		[2] 1											[2] 1		
Saskatchewan	C			[2] 2	[2] 1													
Ceylon: Colombo	C				1						1							
China (see also table below):																		
Amoy	C		3	3														
Dairen	C	10	9	2	2													
Foochow	C	P	P	P	P	P										P		
Hangchow	C	6	4	1			1											
Hankow	C	1	1															
Hong Kong	C	5	2	2					1									
Nanking	C	75	16	5														
Shanghai	C	49	17	14	9							4	1	2	3	1	4	16
Tientsin	C	1	3	1														
Chosen. (See table below.)																		
Colombia (see also table below)	C	60			126			[3] 76		[2] 50	22							
Barranquilla	D				6		1			1					3			
Ecuador: Guayaquil	C				1				1	3						[2] 3	5	
Egypt:																		
Alexandria	C															[4] 1		
Provinces	C		2															
Ethiopia	C															13		
Finland	C			6	8													
France. (See table below.)																		
Gambia (Upper)	C			38														
Gold Coast	C			[5] 12														
Great Britain: England and Wales—London and Great Towns	C	4																
Greece: Salonika	C	37	34	13							10	10	10	10	10			
Guatemala. (See table below.)																		
India	C	36,861	16,397	10,011	5,419	935	934	734	810	687	533	279	317					
	D	9,916	4,696	2,955	1,478	239	262	199	186	166	135	81	73					
Assam	C	270	95	54	79	24	19	17	10	13	24	11	4	12	4	4	16	12
Bombay Presidency	C	2,747	962	647	510	68	71	78	41	52	62	28	22	19	10			
	D	501	192	128	100	8	14	14	10	11	14	9	6	1	3			
Bombay	C	237	99	46	39	2	2	9	4		6	3	1	1		1	1	1
	D	155	68	28	28	2	2	7	3		4	1		1		1	1	1
Calcutta	C	567	275	46	45	4		2		2	6		1	3	2		4	2
	D	460	163	38	39	4	1	3		2	4		1				1	1
Central Provinces and Berar	C	8,043	1,100	477	187	42		15	13	13	6	3	17	7	9	2	9	18
Chittagong	D		3	11						[4] 1			2					[4] 2
Cochin	C						2											
Karachi	C	19	5	2											[4] 1			

[1] Delayed reports.
[2] For 2 weeks.
[3] For 3 weeks.
[4] Imported.
[5] For 4 weeks.
[6] Includes 1 case of pneumonic plague.
[13] Pneumonic plague.
[14] From Jan. to Aug. 31.
[15] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	July 26–Aug. 29, 1936	Week ended— Sept. 1936 5	Sept. 12	Sept. 19	Sept. 26	Oct. 1936 3	Oct. 10	Oct. 17	Oct. 24	Oct. 31	Nov. 1936 7	Nov. 14	Nov. 21	Nov. 28
India—Continued.																		
Madras Presidency	C	1,225	796	752	1,122	134	141	92	75	106	93	102	80	20	32			
	D	215	137	160	205	22	31	26	17	19	23	22	21	3	6			
Madras	C	5			2		1	2					1				2	1
Moulmein	C	35	21	18	10	4	7	1			2	1			2	1	4	5
Negapatam	C	1																
Northwest Frontier Province	C	11	16	15	7		7	15		4	1	1	5	3	4	5	4	2
Punjab	C	377	320	113	52	19	3	3	40	9	4		18	46	86	86	36	
Rangoon	C	4	7	1	5				1	2	2		5	1	2	4	4	
Sind State	C	249	194	54	31	19	19	5	8	1	7	7	6		2			50
Vizagapatam	C	5	2		2					1								
India (French):																		
Chandernagor Territory	C	10	8															
Pondichery Province	C	2		6	1													
	D	1		2														
India (Portuguese)	C									7								
Indochina (see also table below):																		
Pnom-Penh	C		1	1	1	1		5	1		2	1	1		2	1	1	1
Tourane	C	1																
Iran	C		7	1	6	5	4					2						
Teheran	C			1	3	1		3			2	1		1				
Iraq	C	11	1		1					3						3	3	
Baghdad	C	1			1													
Japan:																		
Osaka	C	1	1	2	11	8	4	4	5	2	1	1		12				
Yokohama	C	1																
Mexico (see also table below):																		
Chihuahua	C	2	2															
Guadalajara	D	21	6	3	2		1											
Mexico, D. F.	C	23	15	7	7							1						
Torreon	C			3				2	1	8	1	1	1	2	1		1	
Morocco. (See table below.)																		
Nigeria	C	427	1,028	[5] 512	34					[2] 75	23							
Lagos	C				1				1	1								
Northern Rhodesia	C														76			
Nyasaland. (See table below.)																		
Peru. (See table below.)																		

Portugal (see also table below):																		
Lisbon	C	1		2	2				1									
Oporto	C		1		1			1										
Salvador. (See table below.)																		
Saudi Arabia	C	6																
Sierra Leone	C	9	25	9	3				[2] 38									
Freetown	C	2																
Spain	C	12	23															
Straits Settlements: Singapore	C		[4] 1															
Sudan (Anglo-Egyptian)	C	17	5	1	13	4		[5] 100	1	30	6	17		43			56	57
Turkey. (See table below.)																		
Union of South Africa	C			1	P													
Uruguay. (See table below.)																		

[2] For 2 weeks. [4] Imported. [5] For 4 weeks. [6] For 5 weeks.

On vessels:
- S. S. *Kasagi Maru* at Moji from Shanghai ... 1 case ... May 4, 1936
- S. S. *Awaji Maru* at Nagasaki from Dairen ... 1 case ... May 8, 1936
- S. S. *Bhutan* at Kobe from Shanghai ... 8 cases ... May 13, 1936
- S. S. *Jinkai Maru* at Moji from Hongay ... 1 case ... June 1, 1936

On vessels—Continued.
- S. S. *Rohna* at Penang from Madras ... 1 case ... June 11, 1936
- S. S. *Maya Maru* at Moji from Shanghai ... 2 cases ... June 18, 1936
- S. S. *Talamba* at Rangoon from Calcutta ... 1 case ... Aug 11, 1936

Place		May 1936	June 1936	July 1936	August 1936	September 1936	October 1936
Angola	C		7				
Argentina:							
Buenos Aires Province	C	12					
Chaco Territory	C				1		
Corrientes Province	C		4		6	3	1
Entre Rios Province	C						154
Jujuy Province	C	3	9	6	1		
Los Andes Territory	C						12
Salta Province	C		120				31
Santa Fe Province	C					2	
Belgian Congo	C	75	188	98	88	105	
Bolivia	C	31	8	29	12		
China: Manchuria—Harbin	C	7					
Chosen	C	133	84	21	10	3	
Colombia (see also table above):							
Barranquilla	D		1				
France	C			36	2		
Guatemala	C	1	3	5	13	1	1
Indochina (see also table above)	C	142	78	93	119	87	39
	D	19	10	8	21	8	12
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	2	1				

Place		May 1936	June 1936	July 1936	August 1936	September 1936	October 1936
Mexico—Continued.							
Chihuahua State—Chihuahua	C				1	1	
Jalisco State—Guadalajara	C	37	7		3	3	
	D	26	7		1	1	
Lower California	C	1					
Mexico State	C	4	2				
Mexico, D. F.	C		18	12	5	1	
Mexico City	C	26					
Nayarit State	D		1				
Puebla State—Puebla	C	2	3			2	
Queretaro State	C			1			
San Luis Potosi State—San Luis Potosi	C		1				
Morocco	C	6	3	3	2	1	
Nyasaland	C		4				
Peru	C	10	15	7	74	23	
Portugal (see also table above)	C	24	39		43	83	
	D	2	3		3	4	
Salvador	C	48					
Turkey	C	16		16			
Uruguay	C					1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	Week ended— August 1936 1	8	15	22	29	September 1936 5	12	19	26	October 1936 3	10	17	24	31	November 1936 7	14
Algeria:																				
Algiers Department	C	80	85	73	2	4	10	8									2	1		
Algiers	C	4	3	1		1										1				
Constantine Department	C	61	24	44	30		2	8	2			1		1	1			8	6	
Bone	C	1																		
Constantine	C	2	1	2				2					1						1	
Philippeville	C		1																	
Oran Department	C	12	8	1			1	1								1				
Australia: Sydney	C	1																		
Basutoland	C	18		5						[1] 7										
Bolivia. (See table below.)																				
Bulgaria	C							1												
Ceylon: Colombo	C														1					
Chile	C	199	248		[3] 265			[3] 243		[4] 213			[3] 330							
Santiago	C							[3] 87		[4] 83										
Valparaiso	C	2	4	3			1	1	1	1				1	1		3	1		
China:																				
Hankow	C	2	5	1																
Nanking	C			1																
Shanghai	C	3	7								2						2			
Tientsin	C	4	4	6	1										1					
Tsingtao	C	1		1				1	1											
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	1		2			1	1							2					
Aswan Province	C											1								
Asyut Province	C	2		2		3	1											1		
Beheira Province	C	28	35	8		1														
Cairo	C	8	1	3		1								1	1	2			1	
Dakahliya Province	C	15	9	1																
Faiyum Province	C			1																
Gharbiya Province	C	32	27	5		3												2		
Girga Province	C			1			2													
Minufiya Province	C	2	2	1		2														
Port Said	C	1																		

Qena Province	C	1																		
Sharkiya Province	C	2		7		3	1													
Suez	C		1			1														
Provinces	C	521	336	135	8	14	5	2	1		3	1	1	2	3	1	1	5	3	3
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	5	4	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	1		3		1		1	1	4		2	1	4	2	4		2		2
Hungary	C	1								1										
Iran	C	21	17	8	4					2		6	3			3				
Teheran	C			1									2							
Iraq	C		1																	
Irish Free State:																				
Galway County:																				
Bothar Buidhe	C		1	1																
Oughterard	C			2																
Kerry County—Dingle	C								2	1	2				2					
Mayo County	C	1																		
Lithuania	C	4	11																	
Mexico (see also table below):																				
Durango	D					1														
Mexico, D. F.	C	33	13	14	4	1	7	6	2	6	7	6	4		4	2	6			
Saltillo	D															1				
San Luis Potosi	D		1	1																
Torreon	C		1	1							1						2			
Morocco (see also table below)	C	28	7	6		1														
Palestine:																				
Haifa	C	8	13	6	4	1	3	2	3	1	4	5	6		3	2	2	3	2	3
Jaffa	C			5			5	2	6	5	3	7	8	4	3	3	2		6	1
Panama Canal Zone. (See table below.)																				
Paraguay: Asuncion	D				1	1		1		1										
Peru. (See table below.)																				
Poland	C	587	252	136	22	10	3	5	9	6	11	4	26	16	9	13	6	19	15	34
	D	35	15	11									3							
Portugal. (See table below.)																				
Rumania. (See table below.)																				
Spain: Catalonia	C			1																
Straits Settlements: Singapore	C			3							2		1							
Tunisia:																				
Tunis	C	3	3	2		1				2						1		1		
Provinces	C	114	49	40	7	11			3	10	3		6	7	12	3	5		6	2
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Rotterdam from Algiers	C	1																		

[1] For 6 weeks. [2] For 5 weeks. [3] For 3 weeks. [4] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases, D, deaths, P, present]

Place		May 1936	June 1936	July 1936	August 1936	September 1936	October 1936
Bolivia	C	33	46	47	29		
China: Manchuria—Harbin	C	33	29	15	3	4	
Chosen	C	225		80	20	24	
Czechoslovakia	C	49	23	4	1		
Finland	C	10			1	1	
Greece (see also table above)	C	3	4	3	10	9	11
Guatemala	C	116	59	30	30	38	17
Mexico (see also table above):							
Aguascalientes State. Aguascalientes	C	5	1		3	1	
Chihuahua State	C					1	
Durango State	D				1		
Guanajuato State	C				7		
Jalisco State. Guadalajara	C		1	1	1	1	
Mexico State	C	6		3	10	4	
	D	2	1	2	2		
Mexico, D. F.	C		23	23	19	21	
Mexico City	C	26					
	D	15				8	
Mexico—Continued.							
Oaxaca State	C		1		4	2	
Puebla State. Puebla	C	3	3		10	6	
Queretaro State	C	1	1		1	1	
San Luis Potosi State: San Luis Potosi	C	3	3	3	4	1	
Sinaloa State	D			1			
Morocco (see also table above)	C	26	9	6	2		
Panama Canal Zone	C		2				
Peru	C	81	47	268	67	48	
Portugal	C		1		1	2	
Rumania	C	1,143	427	168	32	25	
Turkey	C	39	25	39	15	27	
Istanbul	C	1	1	2	1	1	
Union of South Africa:							
Cape Province	C	71	60	58	113	43	
Natal	C	2	1				
Orange Free State	C	10	24	2	15	14	
Transvaal	C		1			1	
Yugoslavia	C	125	78	53	16	6	

YELLOW FEVER

Place		Apr. 26–May 30, 1936	May 31–June 27, 1936	June 28–July 25, 1936	Week ended— August 1936					September 1936				October 1936					November 1936		
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21
Bolivia: Santa Cruz Department.[1]																					
Brazil:[1]																					
Amazonas State	C	3																			
Maranhão State	C	1																			
Matto Grosso State	C		1																		
Minas Geraes State	C	5	1																		
	D	5	1																		
São Paulo State[1]	C	16	6																		

Colombia [3]	D							2	1			3									
Boyaca Department.[3]																					
Cundinamarca Department	D			2	1																
Intendencia of Meta—																					
Acacias	D																			1	
Restrepo [3]	D			2		1	1				1						1				
Villavicencio [3]	D											1									
Santander Department [3]	D			2	1	3															
Dahomey	C			[4] 1								[4] 1	1							[4] 1	
French Guinea—Macenta	C										1	[4] 1			1						
Nigeria:																					
Aba	C											[4] 1									
Calabar	C																			[4] 1	
Ilorin Province	D												[4] 1								
Kano	C							[4] 1													
Maiduguri	D																		1		
Senegal:																					
Bambey	C																				1
Khombole	C																	1			
Thies	C		1															[4] 1			
Tivaouane	C		2								1										
Sierra Leone	C												[4] 1			1					
Freetown	C																				[4] 1
Sudan (French):																					
Katibougou	C														1						
Kayes	C			[4] 1																	
Koulikoro	C											1			2						
Segou	C																	1			

[1] Yellow fever has been reported in Santa Cruz Department, Bolivia, as follows: For the months of April, 1 case; May, 1 case; June, 2 cases.

[2] Yellow fever has also been reported in Brazil as follows: São Paulo State, no date given, 3 cases and 4 deaths. Mar. 24–31, 1936, 2 cases, 2 deaths.

[3] Yellow fever has also been reported in Colombia as follows: Boyaca Department, Jan. 4 to May 15, 9 deaths; Restrepo, June 4 to July 30, 7 deaths; Villavicencio, January, June, and July, 6 deaths; Santander Department, June and July, 6 deaths.

[4] Suspected.

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